

## 4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4, “Environmental Consequences,” provides a description of potential impacts that could be expected for the human and natural environment as a result of the Proposed Project and the alternatives. The Corps recognizes that Palmetto Railways is conducting voluntary cleanup and site preparation of the project site, and that these activities will be required to redevelop the site regardless of whether the DA Permit is issued. An evaluation and discussion of the potential impacts that could be expected from these activities are included within each resource section.

Resource areas discussed in this chapter include:

- Geology and Soils (Section 4.1)
- Hydrology (Section 4.2)
- Water Quality (Section 4.3)
- Vegetation and Wildlife (Section 4.4)
- Waters of the U.S. (Section 4.5)
- Protected Species (Section 4.6)
- Essential Fish Habitat (Section 4.7)
- Transportation (Section 4.8)
- Land Use and Infrastructure (Section 4.9)
- Cultural Resources (Section 4.10)
- Visual Resources and Aesthetics (Section 4.11)
- Noise and Vibration (Section 4.12)
- Air Quality (Section 4.13)
- Climate Change (Section 4.14)
- Hazardous, Toxic, and Radioactive Waste (Section 4.15)
- Socioeconomics and Environmental Justice (Section 4.16)
- Human Health and Safety (Section 4.17)
- Section 4(f)/6(f) Resources (Section 4.18)

NEPA requires that three types of impacts be evaluated: direct, indirect and cumulative impacts. Direct and indirect impacts are discussed in Chapter 4, while cumulative impacts are discussed in Chapter 5, as described below:

- **Direct effects** – Direct effects are caused by a proposed action and occur at the same time and place (40 CFR 1508.8). Direct impacts may have both beneficial and adverse effects.
- **Indirect effects** – Indirect effects are caused by a proposed action but occur later in time or are farther removed in distance but still reasonably likely to occur. Indirect effects may include growth inducing effects and other effects related to “induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.8).
- **Cumulative effects** – Cumulative effects are additive or indirect effects that would result from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions (RFFAs), regardless of what agency or person undertakes such other actions (40 CFR 1508.7). Examples of RFFAs that could interact with

Proposed Project-related impacts to result in cumulative impacts are the Charleston Harbor Post 45 (the deepening of the Charleston Harbor to 50+ feet mean low water), construction of the HLT (formerly the Navy Base Marine Container Terminal at the Charleston Naval Complex), and expansion of commercial, institutional, and industrial facilities.

Direct and indirect impacts of the Proposed Project are further evaluated for each resource in relation to context, duration, intensity, type, and potential to occur:

- Context (limited, local, or regional)
- Duration (temporary, short-term, long-term, or permanent)
- Intensity (negligible, minor, moderate, major, No Effect, No Adverse Effect, Adverse Affect)
- Type (beneficial or adverse)
- Potential to occur (unlikely, possible, or probable)

In the introduction for each resource section, the reader is provided a brief description of the methodology used for assessing and evaluating potential impacts, as well as definitions related to the intensity of potential impacts. With the exception of Waters of the U.S., each resource section used the following definitions related to the duration of potential impacts:

- Temporary = Up to 1 week
- Short-Term = Up to 5 years
- Long-Term = Up to 10 years
- Permanent = Longer than 10 years

The definitions related to the duration of potential impacts associated with Waters of the U.S are derived from the time limits associated with the Charleston District Regional Condition for the 2012 Nationwide Permits, which assigns an impact of less than 6 months as Temporary and an impact of greater than 6 months as Permanent.

Lastly, an impact summary, which takes into account the significance of impacts after mitigation implementation, is provided for each resource evaluated at the end of each resource section. When discussing impacts to action alternatives for any resource area, mitigation measures as presented for the Proposed Project would also be applicable to the action alternatives.

## 4.1 GEOLOGY AND SOILS

### 4.1.1 Methods and Impact Definitions

Impacts to geology and soils were evaluated through a review of site-specific geotechnical reports, conceptual development plans specific to the alternatives, and available literature on the regional geology, as well as Geographic Information System (GIS) analysis and best professional judgment. The literature review was used to identify and assess potential alterations to topography; potential



for soil erosion, soil compaction, and/or runoff; unique geologic features, such as paleontological resources, that could be disturbed or impacted; presence of a confining layer(s) above an aquifer; and sources/locations and volume of fill material that would be transported to meet fill requirements for the Proposed Project and alternatives.

Activities associated with the construction and operation of the Navy Base ICTF that could impact the geology and soils within the study area include site preparation for the facility and roadway and rail improvements, and use of staging areas and buffers for construction. These activities can result in soil erosion and/or compaction, as well as modification to slopes and drainage patterns at the site. Long-term changes in soil type and cover across the study area resulting from changes in the landscape also could occur. Impact definitions for Geology and Soils are presented in Table 4.1-1.

Table 4.1-1  
Impact Definitions, Geology and Soils

	Negligible	Minor	Major
<b>Geology and Soils</b>	No effect to unique geologic features; no visible soil erosion and/or loss of topsoil; fill requirements can be met by regional sources of fill material; no effect to confining layers overlaying an aquifer	Unique geologic features are encountered and preserved; localized, short-term soil erosion and loss of topsoil	Unique geologic features are encountered and not preserved; increased soil erosion and runoff that extends beyond the project/alternative sites; fill requirements exceed availability of fill material from regional sources; and breaching of a confining layer overlying an aquifer

#### 4.1.2 No-Action Alternative

Under the No-Action Alternative, the proposed site would continue to be used for mixed-use industrial activities, which could result in new soil impacts, such as erosion. Any future residential, commercial, and/or industrial development in the area may result in minor soil erosion and loss of topsoil; however, these impacts could be mitigated through appropriate use of Best Management Practices (BMPs). The surface soils within the study area have already been significantly disturbed by development within the CNC and region, and former native soils in the study area have been replaced with Urban Land soils. Construction of new buildings and roads in open areas may result in new soil compaction; however, existing mixed-use development and roadways account for at least 40 acres of pavement (and existing soil compaction) within the facility footprint. While naturally occurring seismic (earthquake) events have the potential to produce unstable conditions that could directly affect existing and future facilities, it is not expected that existing or future mixed-use development would impact the frequency or magnitude of seismic events in the region. The No-Action Alternative would likely have no impact to geologic features within the study area.

### 4.1.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Alternative 1 (Proposed Project) would have no significant adverse impacts to the geology and soils in the study area. It is extremely unlikely that unique geologic features, such as paleontological resources, would be encountered during construction of Alternative 1 (Proposed Project) based on the descriptions of the fossils associated with the native soils, and the presence of substantial fill material throughout the CNC. The likelihood of encountering a unique geologic feature would be greater during the construction of portions of the drayage road near existing Waters of the U.S. and bridge improvements areas that are less disturbed than other locations within the study area; however, recent investigations did not identify any archaeological sites within the project site. Two archaeological sites were identified outside the study area (see Section 3.10 for additional information).

The depth to the top of the Ashley formation, which is part of a substantial confining unit that separates the unconfined aquifer from underlying aquifers, is located at 35 to 50 feet bls. This depth is greater than the expected excavation depth required during construction of Alternative 1 (Proposed Project), and as a result, the confining layer would not be expected to be intercepted or breached.

While naturally occurring seismic (earthquake) events have the potential to produce unstable conditions that could directly affect the proposed facilities, it is not expected that construction and/or operation of the Navy Base ICTF would impact the frequency or magnitude of seismic events in the region.

Excavation and construction activities associated with Alternative 1 (Proposed Project) would result in minor, short-term soil erosion; however, the use of BMPs, such as silt fencing, placement of hay, and other common soil retention practices would minimize this adverse impact. Topographical changes that result from construction activities, such as a change in elevation associated with the construction of the drayage road, may result in increased, short-term soil erosion and loss of topsoil, but the use of BMPs would minimize these adverse impacts to be minor. There would be a permanent increase in stormwater runoff resulting from topographical changes and new pavement within the study area (approximately 100 total acres would be paved after construction activities, including the more than 40 acres of existing impervious surface in the facility footprint), which would result in reduced infiltration of surface water through the soil; however, this adverse impact would be minor, and would be minimized by the proposed detention ponds associated with Alternative 1 (Proposed Project). Soil erosion and loss of topsoil would be localized near construction activities, and increased erosion would occur within the confines of the study area.

Short-term compaction of soil would occur within the staging locations of the study area, while permanent compaction would occur in open, pervious areas of the facility site, the drayage road, and

new rail track where pavement and structures are built, and where fill material (surcharge) would be placed. Soil compaction resulting from construction activities would result in a minor adverse impact because the soil in the project site is classified as Urban Land and there are no native soils present.

There are three local borrow sources within 28 miles of the project site that can supply fill material requirements for the construction of the Navy Base ICTF (~105,000 cy). Given the large number of active sand and dirt mines in the region, Alternative 1 (Proposed Project) is expected to cause a relatively small demand in comparison to available resources, resulting in a negligible impact.

#### **4.1.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-Line)**

Impacts to geology and soils resulting from Alternative 2 would be the same as those described for Alternative 1 (Proposed Project) with the exception that adverse soil impacts related to the NS arrival/departure tracks would shift from the Hospital District to those areas that connect to the existing CSX ROW along Spruill Avenue.

#### **4.1.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Impacts to geology and soils resulting from Alternative 3 would be the same as those described for Alternative 1 (Proposed Project) with the exception that adverse soil impacts related to the CSX arrival/departure tracks would shift from the areas associated with the Milford Street connection to areas associated with the Kingsworth Avenue connection.

#### **4.1.6      Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

Impacts to geology and soils resulting from Alternative 4 would be the same as those described for Alternative 1 (Proposed Project) with the exception that adverse soil impacts related to the NS arrival/departure tracks would shift from the Hospital District to those areas associated with the Milford Street connection.

#### **4.1.7      Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)**

Under Alternative 5, impacts to the geology and soils would be similar to those described for Alternative 1 (Proposed Project). The majority of adverse soil impacts would occur at the River Center project site, and new soil disturbance would be minimal as approximately 85 percent of the River Center project site is already paved and/or contains an impervious surface.

#### **4.1.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Impacts to geology and soils resulting from Alternative 6 would be the same as those described for Alternative 5 with the exception that soil impacts related to the CSX arrival/departure tracks would shift from the areas associated with the Milford Street connection to areas associated with the Kingsworth Avenue connection.

#### **4.1.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

Impacts to geology and soils resulting from Alternative 7 would be the same as those described for Alternative 5 with the exception that soil impacts related to the NS arrival/departure tracks would shift from the Hospital District to those areas associated with the Milford Street connection.

#### **4.1.10 Related Activities**

Geology and soils impacts associated with the Related Activities would result in minor adverse impacts to soils because these activities would occur within existing CSX and NS ROWs where the Urban Land soil type has already been compacted and disturbed. Use of BMPs such as silt fencing would minimize the potential for soil erosion and loss of topsoil.

#### **4.1.11 Summary of Impacts Table**

Table 4.1-2 summarizes the environmental consequences to geology and soils from Alternative 1 (Proposed Project) and all of the alternatives.

Table 4.1-2  
Summary of Impacts, Geology and Soils

Alternative	Geology	Soils
<b>No-Action</b>	Negligible	Negligible effects to unique geologic features. Potential minor adverse impact resulting from a short-term increase in soil erosion, a loss of topsoil, soil compaction, and runoff
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Negligible	Negligible effects to unique geologic features. Potential minor adverse impact resulting from a short-term increase in soil erosion, a loss of topsoil, soil compaction, and runoff
<b>2: CSX – Milford / NS – S-line</b>	Negligible	Same as Alternative 1 (Proposed Project)
<b>3: CSX – Kingsworth / NS – Hospital</b>	Negligible	Same as Alternative 1 (Proposed Project)
<b>4: CSX &amp; NS – Milford</b>	Negligible	Same as Alternative 1 (Proposed Project)
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Negligible	Potential minor adverse impact resulting from a short-term increase in soil erosion, a loss of topsoil, soil compaction, and runoff
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Negligible	Same as Alternative 5
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Negligible	Same as Alternative 5

## 4.1.12 Mitigation

### 4.1.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Implement a Storm Water Pollution and Prevention Plan (SWPPP) as required by the National Pollutant Discharge Elimination System (NPDES) permit, including management of sediment and erosion control. (Minimization)
- Implement a Spill Prevention Control and Countermeasures (SPCC) Plan for petroleum products. (Minimization)



- Use Best Management Practices (BMPs) and/or methods of managing sediment and erosion control during construction pursuant to the *South Carolina Stormwater Management Handbook* (South Carolina Department of Health and Environmental Control [SCDHEC] 2005). (Minimization)
- Capping contaminated sites within the ICTF to “seal” existing soil and groundwater contamination. (Minimization)
- Perform all land disturbance activities in compliance with the U.S. Navy Construction Process Document (Navy “Dig” Permit) which identifies the permit process and requirements for conducting construction or other land disturbing activities in Land Use Control (LUC) areas at the former CNC. (Minimization)
- Develop a soil management plan during design to be implemented during construction. (Minimization)
- Use clean fill material. (Minimization)

These avoidance and minimization measures, except the items noted with an asterisk (\*), have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Navy Base ICTF is provided in Chapter 6, Table 6.1.

#### **4.1.12.2 Additional Potential Mitigation Measures**

No additional mitigation measures have been identified by the Corps.

## 4.2 HYDROLOGY

### 4.2.1 Methods and Impact Definitions

Impacts to hydrology within the study area were evaluated qualitatively and quantitatively using GIS, aerial photography, literature reviews, and best professional judgment. Factors that are addressed include impacts to surface water and groundwater flows, infiltration and stormwater runoff, and floodplains.

The City of North Charleston Stormwater Program Permitting Standards and Procedures Manual (City of North Charleston 2008b) requires that all hydrologic computations be completed using volume-based hydrograph methods. For estimating peak flows, the manual further requires the use of SCS Method TR-55 for land disturbances greater than one acre. Stage storage and discharge analysis is required. Computer models approved for use by the County include ICPR, Drain: Edge, PondPack/Civil Storm, HEC-HMS, and HYDRAFLOW.

Impact thresholds are defined and managed under the regulatory framework of municipal and state codes. Table 4.2-1 outlines the potential range of impacts and defines their severity for use in comparison of the alternatives.

Table 4.2-1  
Impact Definitions, Hydrology

Negligible	Minor	Major
No change in surface water or groundwater flows or circulation. No change in impervious surface from pre- to post-construction. Percentage of impervious surface for the site remains below zoning limit and does not increase stormwater runoff. No base floodplain affected or changes in floodway areas or volume of fill in the floodplain.	Temporary or long-term change to surface water flows or circulation, but the changes do not alter the creek or river channel paths. Percentage of impervious surface for the site remains below zoning limit but increases stormwater runoff; base floodplain affected, but placement of fill in the floodplain does not result in flooding to adjacent areas.	Long-term change to surface water flow or circulation that results in alterations to creek and/or river configurations; reductions in groundwater that may impact their use for municipal water supplies. Percentage of impervious surface for the site exceeds zoning limit and increases stormwater runoff; base floodplain affected and placement of fill in the floodplain would result in flooding to adjacent areas.

### 4.2.2 No-Action Alternative

Under the No-Action Alternative, the study area would remain as a mixed industrial land use, where mixed use (residential and commercial) and industrial land uses occur. In light of Palmetto Railways' ownership of the properties, there would be the potential for redevelopment of these areas to include rail-served warehousing and distribution. These land uses could result in alterations to land cover,

and, if adjacent to or within waterways, could have the potential to alter surface water flows and circulation; however, adherence to local ordinances, including the conduct of requisite modeling, and the use of BMPs to control runoff would likely result in a negligible impact to hydrology.

Under the existing zoning, a maximum impervious level of 82 percent would be allowable. If future development within the study area increased the percentage from the existing impervious surface of the project site from 40 to 82 percent, the area would experience a permanent increase, but still below the zoning limit of 82 percent, resulting in a permanent, minor adverse impact. Increases in impervious surface can result in less water infiltration from precipitation, thus reducing groundwater recharge and increasing stormwater runoff. Higher frequency runoff volumes may cause increased flooding, scour, erosion, and the deposition of sediments within waterways. Compliance with current stormwater management requirements, potentially including the use of stormwater detention ponds, with future development would minimize the impact of any increase in stormwater runoff to adjacent water bodies such as Noisette Creek and Shipyard Creek, and instead could provide a minor beneficial impact where no existing stormwater treatment measures exist. The River Center project site would essentially remain at its present 85 percent impervious surface, representing a negligible impact.

Increased impervious surfaces and soil compaction may result from the redevelopment of these areas to include rail-served warehousing and distribution. Soil compaction increases the bulk density of soil reducing its porosity. With fewer natural voids, the rate of infiltration is reduced and the movement of the water below restricted. Localized groundwater recharge is expected to decrease in light of future development's increases in impervious surface; however, any impact to the aquifer's ability to recharge would be negligible based on the aerial extent of the aquifer and location.

The majority of the project site falls within floodplains, with 84 percent within Zone AE, 5 percent within Zone Shaded X, and the remainder within Zone X. Zone AE represents those areas subject to inundation by the 1-percent-annual-chance flood event or the 100-year floodplain, and Zone Shaded X represents those areas between the 100-year and 500-year floodplain limits. Large portions of the River Center project site lie within the 100-year floodplain. Future residential, commercial, and/or industrial development activities would likely result in the placement of fill and could potentially increase elevations within the study area; however, in light of the existing floodplain zone designations, the fact that the BFE would not change because it is based on coastal surge, and because development activities would conform to applicable State and/or local floodplain protection standards, the development would not increase the flood hazard to other properties. Impacts to floodplains would be negligible.

### 4.2.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Alternative 1 (Proposed Project) would involve activities that can affect hydrology, such as the construction of impervious surfaces associated with the Navy Base ICTF, and roadway and rail improvements adjacent to and/or within Noisette Creek and Shipyard Creek. Construction of the facility would also require grading of the facility site; however, this fill would be sourced both on-site and off-site. Permanent placement of additional bridge pilings within Noisette Creek and Shipyard Creek would introduce permanent obstructions into the waterways. Alternative 1 (Proposed Project) would involve an additional bridge across Noisette Creek to accommodate the arrival/departure tracks for NS trains; however, the minimal number of pilings, as well as the design of the bridges to minimize the placement of new pilings within waterways, would result in a negligible impact to surface water flows and circulation patterns. It is not expected that areas within these waterways would be subjected to a measureable change in tidal velocities or alteration in creek configuration as a result of the Alternative 1 (Proposed Project) elements.

Embankment construction through the tidal salt marsh for the arrival/departure tracks near the southwestern limits of the project would result in the fragmentation of habitat and potential loss of a hydrologic connection to Shipyard Creek; however, the placement of culverts as proposed by the Applicant as a mitigation measure, which would be sized to minimize upchannel surcharge of runoff, would maintain tidal flushing to tidal salt marsh areas to the east of the arrival/departure tracks, and would ensure that any change in hydrology or potential for flooding upstream would be negligible.

Increases to impervious surfaces would be expected to be similar to a full build-out under the No-Action Alternative, resulting in a permanent, minor adverse impact, with the existing impervious surface of the project site increasing from 40 to 82 percent; however, stormwater management improvements by Palmetto Railways, including placement of pipe of varying sizes, underdrains, construction of four dry detention ponds, and vegetated swales, as well as other BMPs associated with roadway and rail improvements, would collect and slowly release stormwater runoff. As a result, these mitigation measures would minimize the potential for adverse impacts to Noisette Creek, Shipyard Creek, and the Cooper River. Overall, stormwater runoff would be better captured and detained, and its discharge managed, to prevent downstream scour under Alternative 1 (Proposed Project) versus existing conditions, resulting in a minor beneficial impact because no such stormwater facilities currently exist.

Increased impervious surfaces and soil compaction may result from the construction of the proposed embankments and structures. Localized groundwater recharge is expected to decrease in light of the increase in impervious surface within the project site; however, any impact to the aquifer's ability to recharge would be negligible based on the aerial extent of the aquifer and the project site's location.

As discussed under the No-Action Alternative, most of the project site lies within the floodplain, Zone AE and Zone Shaded X (Figure 4.2-1). The Navy Base ICTF design was based on the effective FIRM data at the time of the EIS, and the design requires the placement of fill within the project site. Accordingly, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the Navy Base ICTF would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

#### **4.2.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

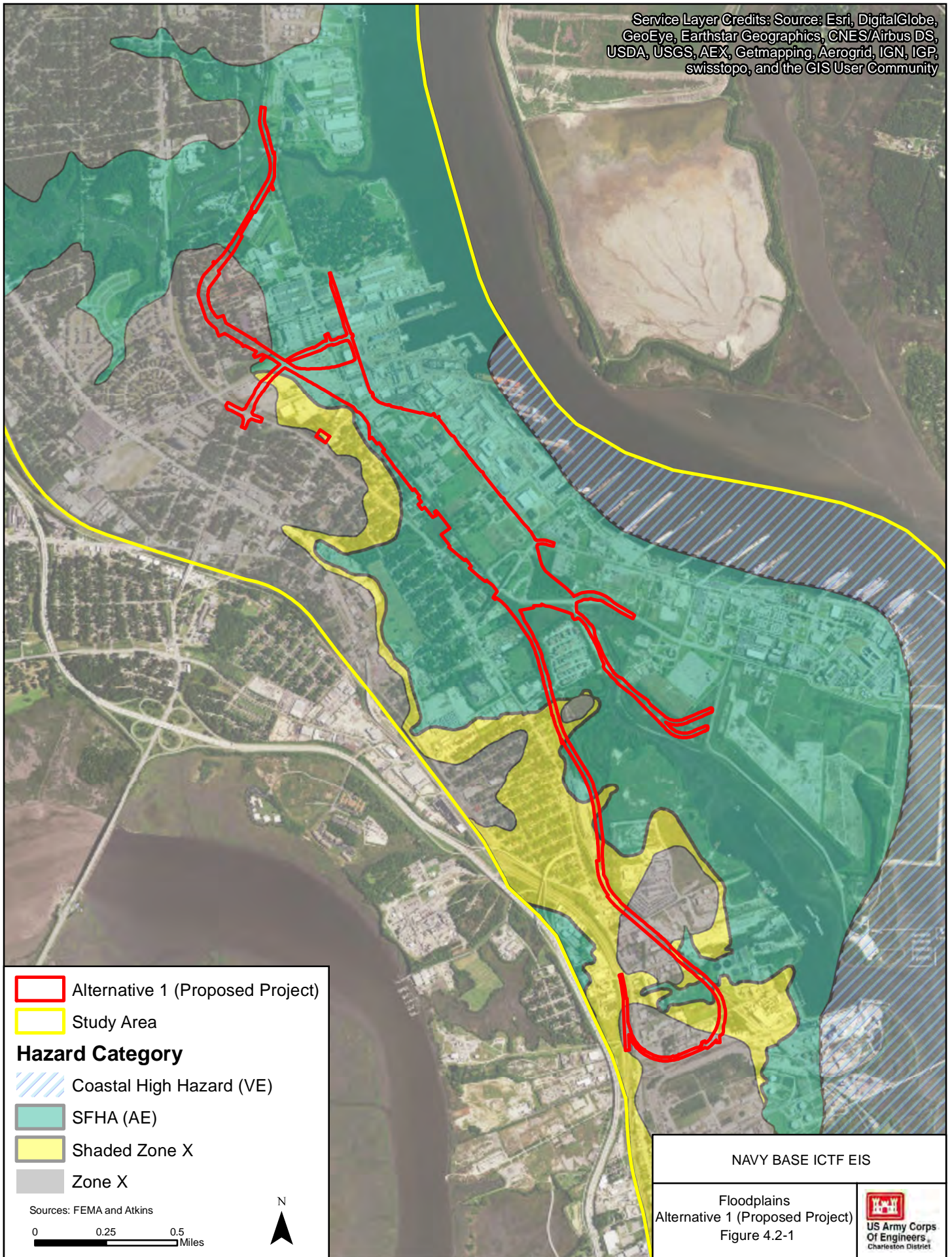
Under Alternative 2, impacts to hydrology and impervious surfaces would be similar to those discussed under Alternative 1 (Proposed Project). As discussed under the No-Action Alternative, most of the project site lies within the floodplain, Zone AE and Zone Shaded X. Alternative 2 is similarly situated, with 83 percent of land within the limits of construction falling within Zone AE, 5 percent falling within Zone Shaded X, and the remainder within Zone X (Figure 4.2-2). Due to construction activities associated with Alternative 2, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the development would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

#### **4.2.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Under Alternative 3, impacts to hydrology and impervious surfaces would be similar to those discussed under Alternative 1 (Proposed Project). The majority of the project site lies within the floodplain, Zone AE and Zone X, with 88 percent of land within the limits of construction falling within Zone AE, 5 percent falling within Zone Shaded X, and the remainder within Zone X (Figure 4.2-3). Due to construction activities associated with Alternative 3, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the development would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

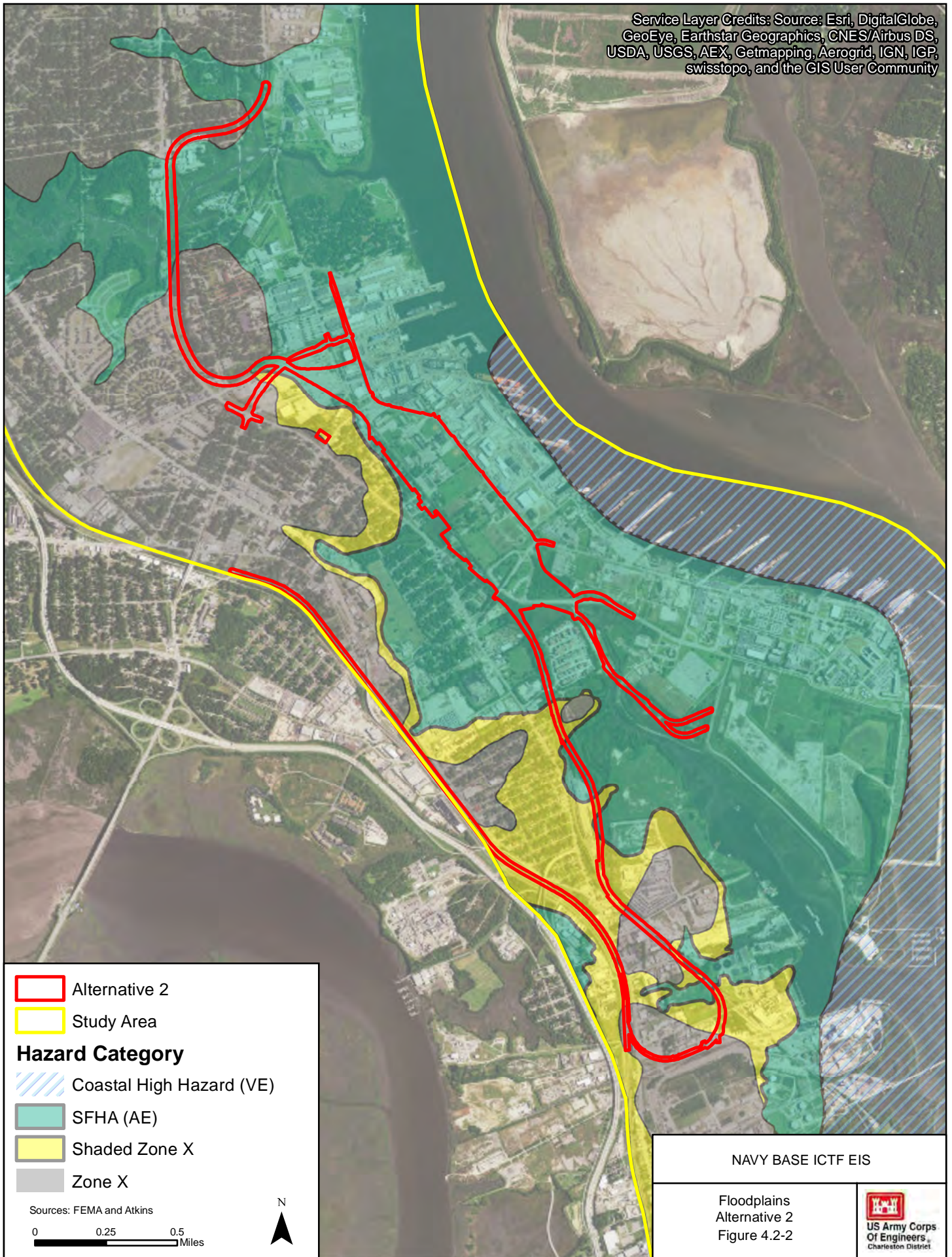


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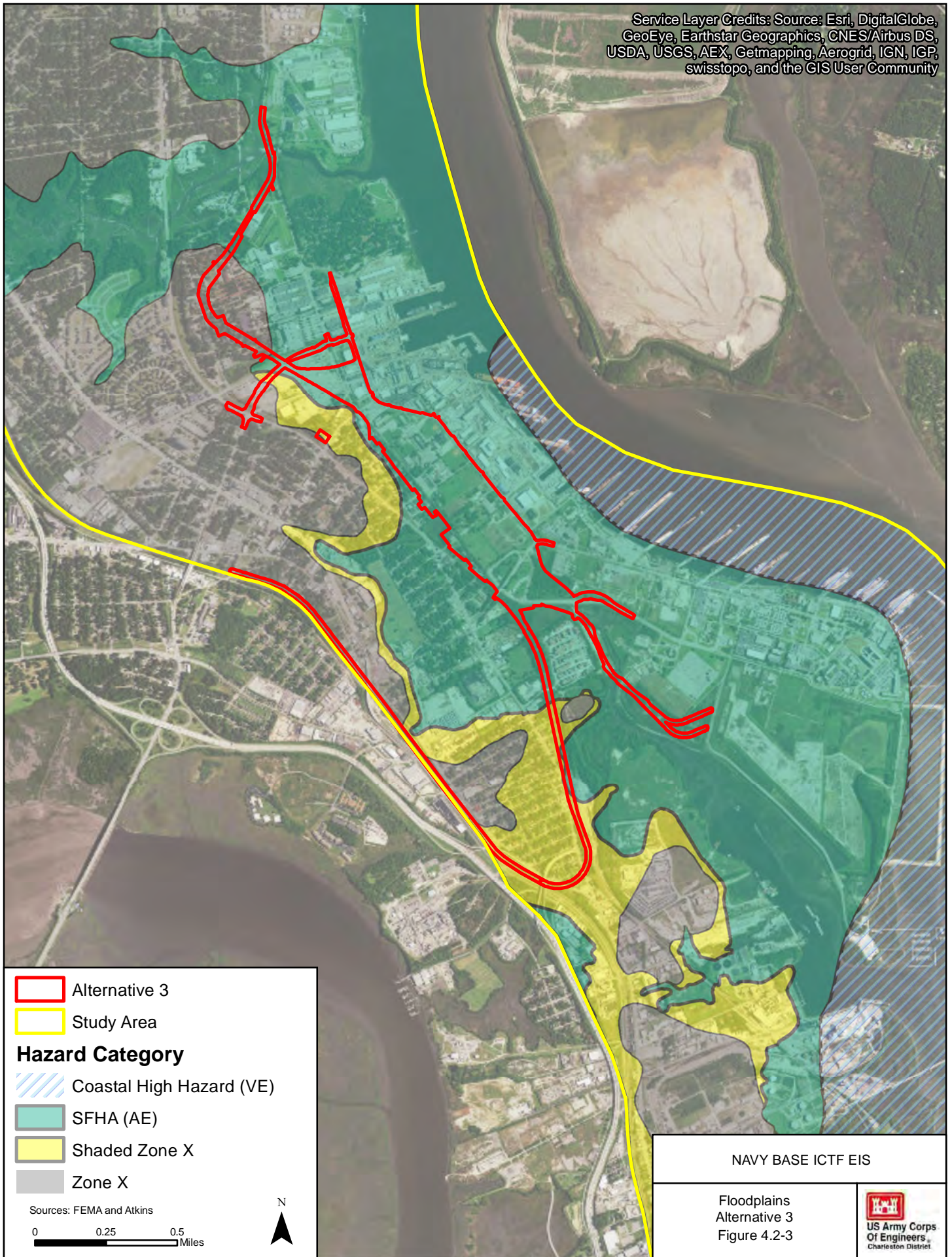


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#### **4.2.6      Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

Under Alternative 4, impacts to hydrology and impervious surfaces would be similar to those discussed under Alternative 1 (Proposed Project). The majority of the project site lies within the floodplain, Zone AE and Zone X, with 81 percent of land within the limits of construction falling within Zone AE, 7 percent falling within Zone Shaded X, and the remainder within Zone X (Figure 4.2-4). Due to construction activities associated with Alternative 4, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the development would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

#### **4.2.7      Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)**

Under Alternative 5, impacts to hydrology would be similar to those discussed under Alternative 1 (Proposed Project). There would not be a notable increase in impervious surfaces under Alternative 5 because a majority of the River Center project site is already paved and contains an impervious surface (current percentage 85%). As a result, there would be a negligible impact to infiltration rates and groundwater recharge. The use of dry detention ponds associated with the River Center ICTF would instead result in a minor beneficial impact by improving the capture and treatment of stormwater runoff where no such stormwater facilities currently exist.

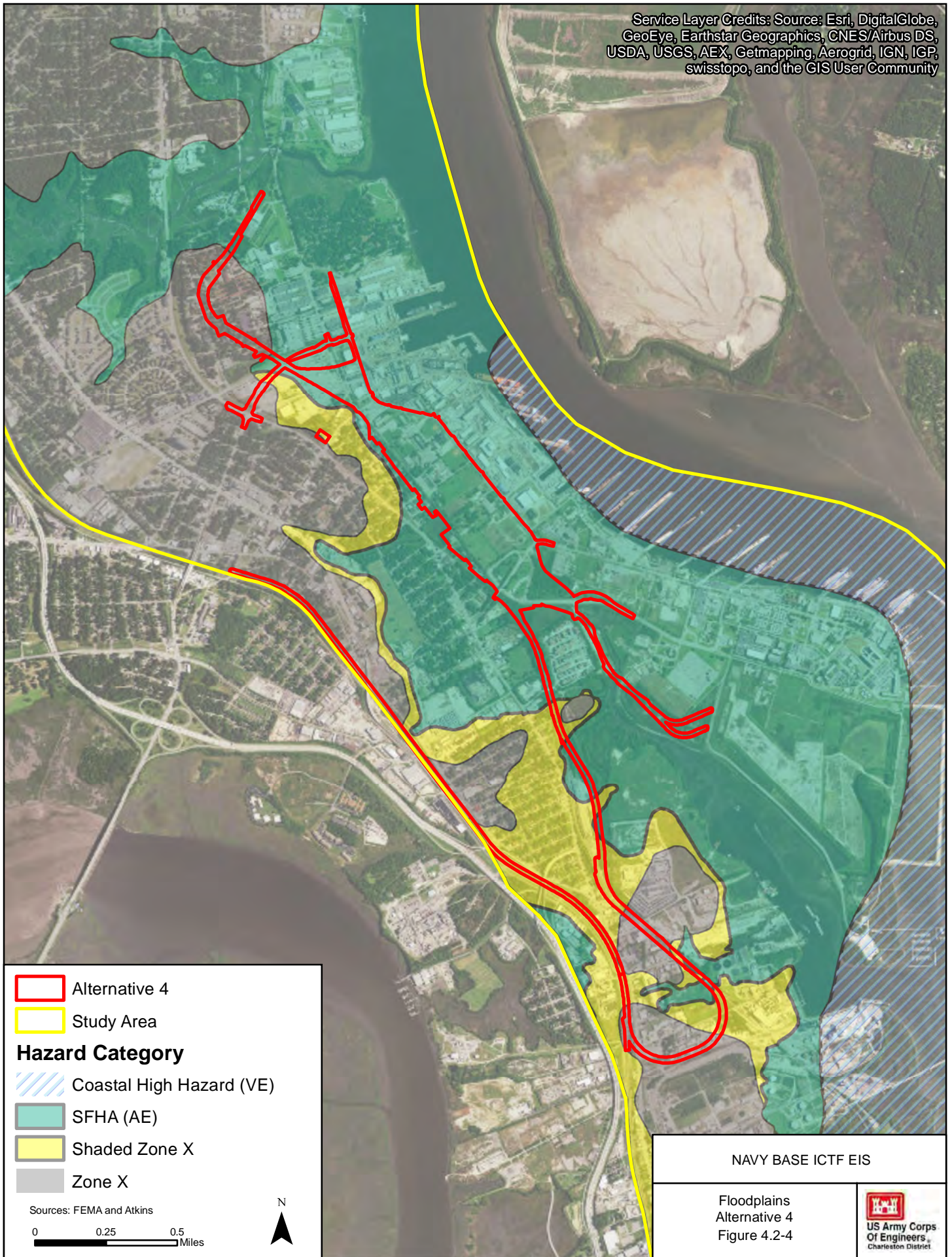
A large portion of the River Center project site lies within the 100-year floodplain (Zone AE), with 76 percent of the land within the limits of construction falls within Zone AE, 7 percent falls within Zone Shaded X, and the remainder within Zone X (Figure 4.2-5). Due to construction activities associated with Alternative 5, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the development would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

#### **4.2.8      Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

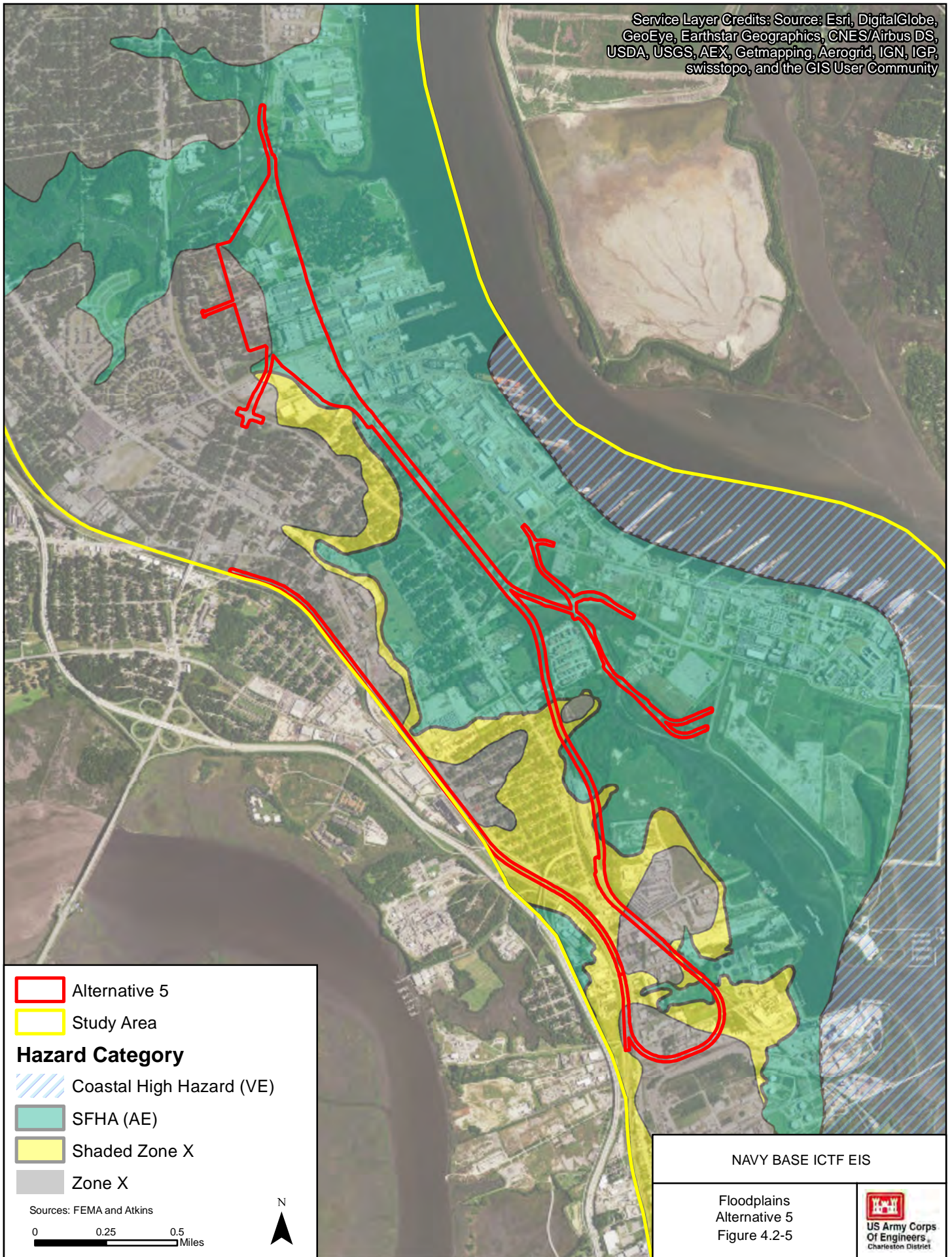
Under Alternative 6, impacts to hydrology and impervious surface area would be similar to those discussed under Alternative 5. Under Alternative 6, 81 percent of the land within the limits of construction falls within Zone AE, 5 percent falls within Zone Shaded X, and the remainder within



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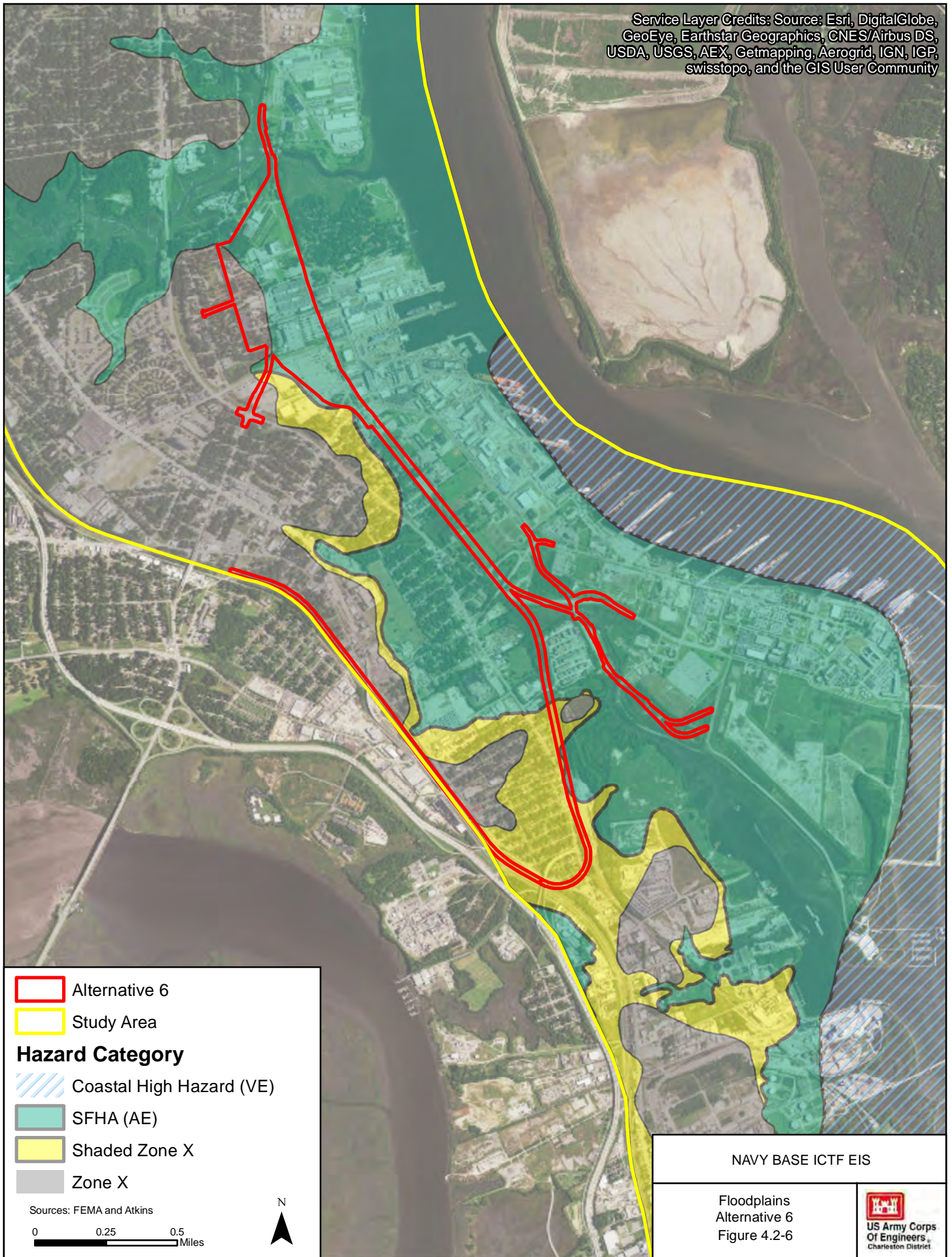








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Zone X (Figure 4.2-6). Due to construction activities associated with Alternative 6, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the development would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

#### **4.2.9      Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

Under Alternative 7, impacts to hydrology and impervious surface area would be similar to those discussed under Alternative 5. Under Alternative 7, 74 percent of the land within the limits of construction falls within Zone AE. 8 percent falls within Zone Shaded X, and the remainder within Zone X (Figure 4.2-7). Due to construction activities associated with Alternative 7, surface elevations may increase in the project site; however, similar to the No-Action Alternative, the BFE would not change. Therefore, the development would not increase the flood hazard to other properties, and impacts to floodplains would be negligible. If the floodplain zone(s) changes for the project site as a result of upcoming updates to the FIRMs (but not the BFE), then Palmetto Railways would need to coordinate with the local NFIP to obtain any necessary permits.

#### **4.2.10      Related Activities**

None of the land within the limits of construction for the Related Activities for Alternative 1 (Proposed Project) falls within Zone AE. Over 41 percent of the Related Activities associated with Alternative 1 (Proposed Project) would fall within floodplain Zone Shaded X. The Related Activities associated with most other alternatives are similarly situated within Zone Shaded X. Approximately 24 percent of the Related Activities associated with Alternatives 3 and 6 falls within Zone Shaded X. Alternatives 4, 5, and 7 would have 40 percent of land within Zone Shaded X. Like Alternative 1 (Proposed Project), none of these alternatives would have Related Activities within Zone AE.

The only alternative with Related Activities that would fall within Zone AE is Alternative 2. Under Alternative 2, 8 percent of the land within the limits of construction for the Related Activities falls within Zone AE, and 33 percent of the remainder falls within Zone Shaded X. The portions of this alternative that lie within the 100-year floodplain are associated with the rail bridge across Noisette Creek.

#### **4.2.11      Summary of Impacts Table**

Table 4.2-2 summarizes the environmental consequences to hydrology from Alternative 1 (Proposed Project) and all of the alternatives.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

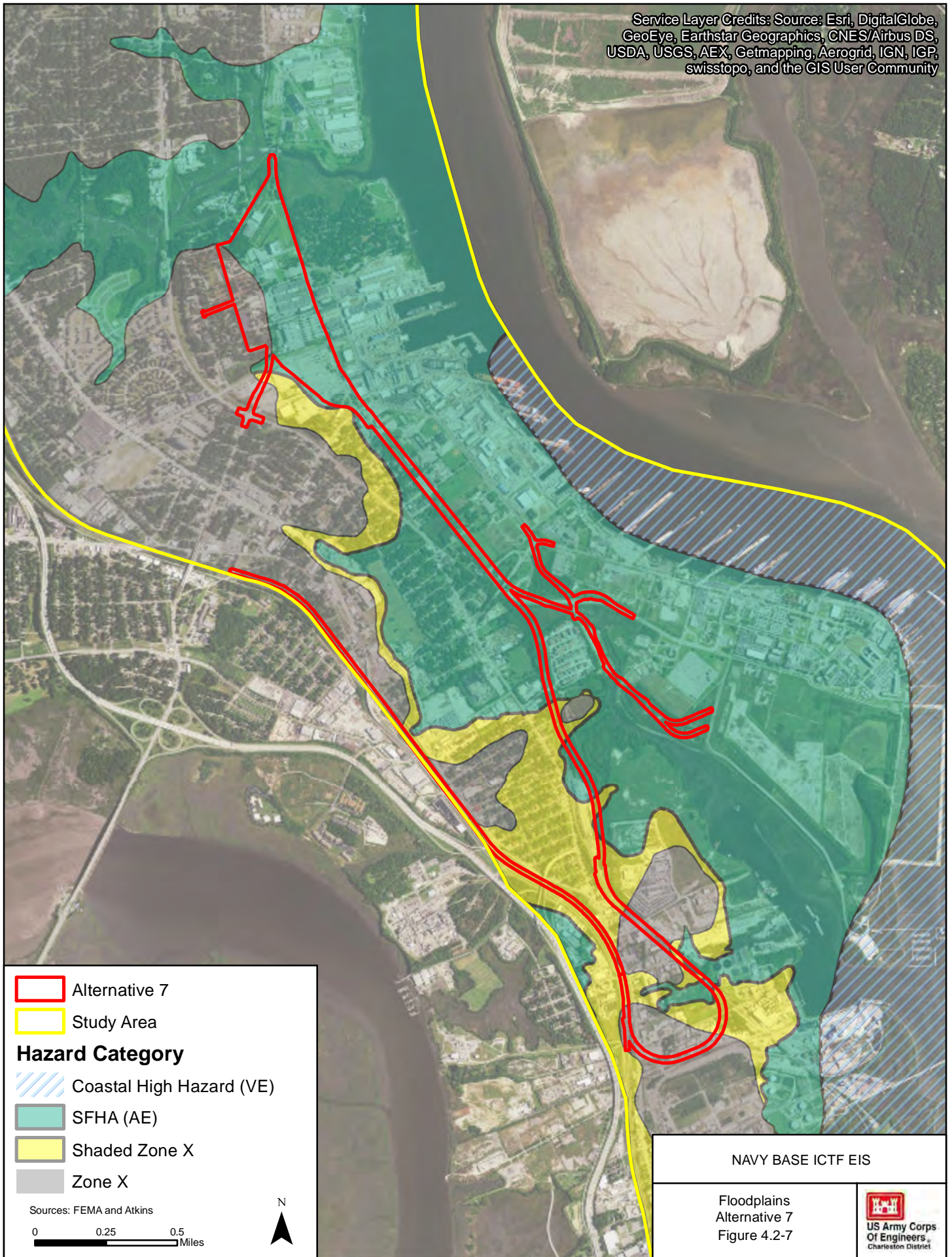


Table 4.2-2  
Impacts Summary, Hydrology

Alternative	Surface water and groundwater flows and circulation	Impervious Surface/ Infiltration and Stormwater Runoff	Floodplains
<b>No-Action</b>	Negligible impact to surface water flows and circulation resulting from construction activities within and/or adjacent to waterways (e.g., bridges); negligible impact to groundwater	Permanent, minor adverse impact from potential increase in impervious surface; negligible or possibly minor beneficial impact from improved stormwater management	Negligible impact to base floodplain resulting from the placement of fill; negligible impact to flood hazard for adjacent areas
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Negligible impact to surface water flows and circulation resulting from roadway and rail improvements (e.g., arrival/departure tracks, bridges) across Noisette Creek and Shipyard Creek; negligible impact to groundwater	Permanent, minor adverse impact from increase in impervious surface; minor beneficial impact from improved stormwater management	Negligible impact to base floodplains resulting from the placement of fill; negligible impact to flood hazard for other adjacent areas
<b>2: CSX – Milford / NS – S-line</b>	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
<b>3: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
<b>4: CSX &amp; NS – Milford</b>	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Negligible impact to surface water flows and circulation resulting from roadway and rail improvements (e.g., arrival/departure tracks, bridges) across Noisette Creek and Shipyard Creek; negligible impact to groundwater	Minor beneficial impact from improved stormwater management	Negligible impact to base floodplain resulting from the placement of fill; negligible impact to flood hazard for other adjacent areas
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5



## 4.2.12 Mitigation

### 4.2.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Design culverts and/or bridges to maintain existing surface drainage patterns and to prevent erosion. (Minimization)
- Where possible, limit the placement of pilings for bridges within waterways. (Avoidance)
- Design culverts (e.g., under the arrival/departure tracks) and bridges to maintain existing flow and hydrology for wetland areas and to prevent flooding upstream. (Minimization)
- Provide stormwater capacity improvements by constructing new stormwater infrastructure where existing systems are failing from lack of maintenance. (Minimization)

These avoidance and minimization measures, except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures is also provided in Chapter 6, Table 6-1.

### 4.2.12.2 Additional Potential Mitigation Measures

The Corps proposes an additional mitigation measure that the pre-construction course, condition, capacity, and location of open waters must be maintained.

## 4.3 WATER QUALITY

### 4.3.1 Methods and Impact Definitions

Impacts to the water quality of waterways and groundwater basins within the study area that could potentially be affected by stormwater runoff, erosion, or other methods of contaminant contribution were evaluated using literature review, GIS, loading estimates for TSS and nutrients, and best professional judgment. Potential impacts of water quality constituents of concern (e.g., DO, nutrients, TSS, bacteria, salinity, various metals, PAHs, and pesticides) were evaluated as part of the analysis. Average annual pollutant loads for TSS and nutrients (TN and TP) were estimated for the project site and the River Center project site using a GIS-based Pollutant Loading Model that uses existing and proposed land use, soils, BMPs, and contributing basin delineations (PBS&J 2010). Percent reduction calculations were based on the total basin area contributing to each site. Off-site drainage was not considered in this analysis, since it either bypasses through the project site or has been diverted around the project site. Results were assessed in the context of the DO TMDL revision for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a). Potential interactions of new stormwater infrastructure (e.g., stormwater detention ponds) with contaminated soil or groundwater associated with existing contamination sites (e.g., nearby Superfund Site at the Macalloy property) were evaluated using GIS.

The impact evaluation considers both construction and operation activities associated with the Proposed Project and alternatives. Impacts to water quality were characterized as negligible, minor, or major as defined in Table 4.3-1.

Table 4.3-1  
Impact Definitions, Water Quality

Negligible	Minor	Major
Undetectable changes to surface water quality; undetectable change to groundwater recharge or quality.	Changes in surface water quality that do not exceed water quality standards. TMDL load reductions are not compromised. Changes in groundwater recharge and quality that require permitting, treatment, and proper disposal of dewatering effluent to prevent migration of contaminated groundwater into uncontaminated areas.	Changes in surface water quality that exceed regulatory standards. TMDL load reductions are compromised and adverse impacts are long-term. Changes in groundwater recharge that require additional, extensive permitting and Federal/State oversight, or changes in water quality that exceed regulatory standards for groundwater and contaminated wells and/or municipal water supplies.

### 4.3.2 No-Action Alternative

#### 4.3.2.1 Surface Waters

For the purposes of this EIS, it is assumed that the project site and River Center project site would continue to include mixed use (residential and commercial) and industrial land uses, such as rail-served warehousing distribution. The current land uses on these sites are heavy industrial district, light industrial district, and PDD; therefore, there are no large-scale changes to land use anticipated; however, an increase in impervious surface, pollutant loading, or the likelihood for accidental spills could result in potential impacts to surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River. Water quality constituents of concern would include DO, salinity, TSS, turbidity, nutrients, bacteria, heavy metals, and other toxic contaminants (VOCs, SVOCs, chlorinated pesticides/PCBs, PAHs, and dioxins). The fate of these pollutants is affected by currents, tides, and flow patterns. For example, pollutants entering surface waters downstream of the site may be transported upstream during incoming tides. Potential impacts to water quality would be evaluated with respect to the status of the current TMDL for DO (SCDHEC 2013a).

#### Dissolved Oxygen

DO concentrations in surface waters could be affected by the No-Action Alternative due to changes in: (1) circulation patterns that can impact re-aeration of the water column and residence time of biodegradable organic compounds, measured as biochemical oxygen demand (BOD), in the river and creeks; (2) pollutant loading that can increase the BOD, resulting in decreased DO; and (3) salinity, which can result in changes in the DO saturation level (oxygen solubility decreases as salinity increases). Under the No-Action Alternative, impacts to DO concentrations in surface waters are unlikely. Furthermore, stormwater facilities and other infrastructure would be required by Federal, State, and local authorities for any new development on the site (see Section 8, Regulatory Environment Overview). Additionally, given that any new development on the site would discharge into the Cooper River, all design requirements would need to be in compliance with the TMDL for DO established for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a; City of North Charleston 2008b). Depending on the size of the project, the associated permitting process would go through the City of North Charleston (City of North Charleston 2008b) or the State (SCDHEC 2011). According to the City of North Charleston's Permitting Standards and Procedures Manual (2008b), compliance would require the installation and implementation of measures (structural or non-structural BMPs) that are expected to adequately reduce pollutant loads to levels required by the TMDL (currently expressed as % reductions) or to prevent further impairment. If the site is greater than 25 acres, a quantitative and qualitative analysis would be performed as part of the stormwater application and would include, at a minimum, calculations that show:

- a site's pollutant load for all pollutants of concern
- the trapping effectiveness of the chosen BMPs

- that the runoff discharged through the last water quality BMP has a water quality level equal to or better than the in-stream standard, or as required by an applicable TMDL

As a result, negligible (no) additional adverse impacts to DO would be anticipated under the No-Action Alternative; minor beneficial increases in runoff quality contributing to surface waters due to implementation of current stormwater BMP requirements would be possible.

### Salinity

There would be no expected changes to existing salinity gradients under the No-Action Alternative.

### Total Suspended Solids and Turbidity

Suspended sediments levels in surface waters may increase temporarily due to stormwater runoff from disturbed lands during upland construction activities and during construction in or adjacent to Shipyard Creek or Noisette Creek. Upland construction activities could potentially involve the disturbance and transport of large quantities of earth, resulting in a temporary increase in stormwater runoff TSS and turbidity; however, all activities would be performed in compliance with State and local stormwater regulations. Construction within Shipyard or Noisette Creeks may disturb the respective creek bottoms and banks, resulting in temporary increases in TSS and turbidity. Implementation of surface water monitoring and the use of appropriate temporary stormwater management/erosion and dust control BMPs (e.g., temporary silt fences and turbidity curtains, sprinkling/irrigation) would help control turbidity during construction and protect surface waters. As a result, impacts to surface waters resulting from stormwater runoff during construction would be negligible and localized.

Long-term changes in pollutant loading from stormwater runoff caused by an alteration of land topography, decreased soil permeability and vegetative cover, and increased impervious surface also may lead to increased TSS and turbidity levels in Shipyard and Noisette Creeks and the Lower Cooper River. These impacts would be compounded by the already slightly increasing trend in TSS in Shipyard Creek; data are not available to determine potential trends in TSS in Noisette Creek (see Section 3.3.2.4). Although these types of land use changes would be expected to cause an increase in stormwater runoff suspended sediment concentrations, onsite stormwater management would be in compliance with current State and local stormwater regulations. In addition, adverse impacts would be reduced because the NPDES stormwater permitting process requires a Stormwater Pollution Prevention Plan (SWPPP) and Stormwater Master Plan. As stormwater treatment does not currently exist on the sites, the addition of stormwater management practices would be expected to result in a beneficial impact through minor to moderate reductions in suspended sediment concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River.

## Nutrients

Sources of nutrients in surface waters primarily include wastewater and fertilizers. Pollutant loading from stormwater runoff resulting from land use changes associated with the No-Action Alternative may lead to increased nutrient levels in surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River. Potential increases in nutrient concentrations would be compounded by an already existing increasing trend in TP at Station MD-045 in the Lower Cooper River; data are not available to determine potential trends in nutrients in Noisette Creek (see Section 3.3.2.4). Any increase in nutrient levels in surface waters of Shipyard Creek and the Lower Cooper River would be compounded by an already existing increasing trend in TP at Station MD-045 in the Lower Cooper River (see Section 3.3.2.4). Despite the potential for increased nutrient concentrations in stormwater runoff, onsite stormwater management would be in compliance with State and local stormwater regulations and the site's SWPPP and Stormwater Master Plan. As there is currently no stormwater treatment provided on the site, the addition of stormwater management practices and the implementation of the local TMDL for DO (SCDHEC 2013a) would be expected to result in a beneficial impact through minor to moderate reductions in nutrient concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River.

## Bacteria

Typical sources of bacteria and pathogens in surface waters include wastewater infrastructure, wildlife, and stormwater. Bacteria and pathogens primarily contribute to stormwater through illicit connections from wastewater infrastructure, poorly functioning septic systems, runoff from specific land uses (e.g., agricultural areas, dog parks), and animal wastes. The No-Action Alternative would not likely include any components or activities that would increase bacteria or pathogen levels above current concentrations. As a result, future activities under the No-Action Alternative should have a negligible effect regarding bacteria in the surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River.

## Heavy Metals and Other Toxic Contaminants

The No-Action Alternative may result in an increase in the number of trucks and locomotives operating on roads and railways throughout the study area. Oils and grease generated from leaks, heavy metals from vehicle exhaust, worn tires and engine parts, brake pads, or rust—as well as fertilizers, pesticides, and herbicides used alongside roads and railways—would contribute to stormwater runoff pollution (Wilkomirski et al. 2011, Nixon and Saphores 2007). The contribution of additional heavy metals would be compounded by already elevated levels of copper in Shipyard Creek; data are not available to determine potential trends in nutrients in Noisette Creek (see Section 3.3.2.4). In addition, any potential construction activities within Noisette or Shipyard Creeks could result in the release of sequestered contaminants from sediments (see Section 3.3.3). Implementation of onsite stormwater management practices would be in compliance with State and

local stormwater regulations and the site's SWPPP and Stormwater Master Plan. As there is no stormwater treatment currently on the site, the addition of these stormwater management practices may result in a beneficial impact through minor reductions in concentrations of heavy metals and other toxic contaminants being contributed to Shipyard Creek, Noisette Creek, and the Lower Cooper River. In addition to stormwater management practices, special precautions, as discussed in Section 4.15 (Hazardous Waste and Materials), are also required when excavating or dewatering during construction projects in areas that have Land Use Controls (LUCs) and are part of the Voluntary Cleanup Contract (VCC) between Palmetto Railways and the South Carolina Department of Health and Environmental Control (SCDHEC). Although there is potential for both minor adverse and major adverse impacts, compliance with permitting requirements and use of BMPs and spill prevention programs would minimize the potential for adverse impacts.

#### **4.3.2.2 Accidental Spills**

Development under the No-Action Alternative may require the use and maintenance of additional fueling facilities and storage of hazardous materials resulting in the potential for accidental spills. These facilities would be operated and maintained (and the chemicals used) in compliance with Federal, State, and local regulations, thus resulting in minimal to negligible adverse impacts.

It is reasonable to assume that if there is additional truck and rail traffic associated with the No-Action Alternative, there may be an increased potential for accidental pollutant spills involving petroleum products or hazardous materials that could impact surface water quality. Accidentally spilled liquids should be intercepted and temporarily contained by the storm sewer system to prevent draining directly into onsite or nearby surface waters. If more than 1,320 gallons of oil is stored for onsite use, a detailed plan designed to minimize impacts resulting from accidental spills would be provided in a Spill Prevention, Control, and Countermeasures (SPCC) Plan, which would be maintained onsite (40 CFR Part 112.1). As a result of these measures, impacts to surface waters from accidental spills would be minor and localized. Impacts associated with the use and storage of fuel and hazardous materials are addressed in more detail in Section 4.15, Hazardous, Toxic, and Radioactive Waste.

#### **4.3.2.3 Stormwater Runoff**

Upland construction activities, as well as construction adjacent to Shipyard Creek or Noisette Creek, could involve the disturbance and transport of large quantities of earth, resulting in a temporary increase in stormwater runoff (TSS and turbidity); however, all activities would be performed in compliance with State and local stormwater regulations. Temporary sediment basins and other temporary stormwater management/erosion control BMPs would be implemented to control runoff and protect surface waters during future construction activities. As a result, impacts to water quality from stormwater runoff during construction would be negligible.

Increased impervious surface and other watershed alterations (e.g., decreased soil permeability and vegetative cover) that may result from the No-Action Alternative would increase runoff quantity and associated non-point source (nps) pollutant concentrations. For example, some of the existing permeable areas may be replaced with impermeable surfaces, resulting in increased stormwater runoff. Stormwater on the sites is currently transported primarily through a series of underground storm sewers that outfall into Shipyard Creek and the Lower Cooper River. There is currently no treatment of stormwater runoff on the existing sites before being discharged through outfalls into Shipyard Creek or the Lower Cooper River. Although there could be an increase in impervious surface, there would also be the addition of stormwater management structures to detain and treat runoff, potentially improving water quality on the site.

A potential increase in vehicular or rail traffic and operating equipment associated with the No-Action Alternative may result in the contribution of various pollutants to stormwater runoff. Common pollutants associated with motor vehicles include used oils, grease, and heavy metals. Van Metre et al. (2000) showed that vehicles are a significant source of PAHs in water bodies due to tire wear, engine oil leaks, and exhaust, while heavy metals such as zinc and copper are significant pollutants on roadways due to tire and brake wear, respectively (Adachi and Tainosho 2004), contributing to stormwater runoff loads. Similarly, PAHs and heavy metals are the two most important types of pollutants associated with railway transport (Wilkomirski et al. 2011). In addition to those pollutants that originate from the vehicles and locomotives themselves, nutrients, suspended solids, and organics that attach to the outer surfaces or undercarriage also contribute to stormwater runoff from roadway and railway surfaces during rain events. Stormwater management for runoff generated from additional roadways or railways would be in compliance with State and local stormwater regulations and the site's SWPPP and Stormwater Master Plan. As a result, impacts to water quality would be negligible.

#### 4.3.2.4 Sediments

Potential construction activities within or adjacent to Shipyard Creek or Noisette Creek may disturb the aquatic sediments in the respective waterways. Appropriate BMPs would be employed by Palmetto Railways and/or other developers to control the disturbance of sediments and any resulting erosion and sedimentation. Available sediment quality data from the turning basin of Shipyard Creek (Station R000056; Figure 3.3-2) indicate elevated levels of arsenic, copper, chromium, and eight PAHs in 2000, and moderate levels of contamination (Station NOR09056; Figure 3.3-2) in 2009 (SCECAP 2014); no sediment quality data are available for Noisette Creek (see Section 3.3.3). Because contaminated sediments also are potentially present in areas farther upstream in Shipyard Creek, as well as in Noisette Creek, appropriate management actions may be required to control the potential release of pollutants into the water column during construction. Impacts to water quality would likely be localized and minor.



### 4.3.2.5 Groundwater Resources

The No-Action Alternative would result in negligible impact with regard to groundwater recharge. Although there would be an increase in the impervious areas at the sites (Section 4.2, Hydrology)—thereby reducing local infiltration and surficial aquifer recharge—there are no active groundwater wells utilizing the underlying aquifers for public potable water within or near the sites. The two wells that are located within the project site, CHN-2 and CHN-476, are indicated for industrial use and currently unused, respectively (SCDNR 2007). In addition, additional demands on groundwater resources would not likely occur under the No-Action Alternative.

Excavation and use of stormwater infrastructure or ponds in areas that have LUCs and are part of the VCC would require permitting, treatment, and proper disposal of the dewatering effluent to prevent migration of contaminated groundwater into uncontaminated areas. Avoidance and minimization measures would help to keep impacts to a minimum; however, there would be the potential for both minor adverse and major adverse impacts. Potential groundwater contamination issues are addressed in more detail in Section 4.15, Hazardous Waste and Materials.

### 4.3.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Construction and operation activities associated with the Navy Base ICTF under Alternative 1 (Proposed Project) would have the potential to impact water quality in Shipyard Creek, Noisette Creek, and the Cooper River. For Alternative 1 (Proposed Project), four dry detention ponds and a sediment forebay would be used for pollutant and sediment removal, and proposed BMPs by Palmetto Railways were considered to provide treatment levels in compliance with State regulations (SCDHEC 2012c).

#### 4.3.3.1 Surface Waters

Alternative 1 (Proposed Project) would result in impacts to surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River that are similar to the No-Action Alternative, with a few exceptions. Potential impacts to water quality are discussed in the following subsections and are evaluated with respect to the status of the current TMDL for DO (SCDHEC 2013a).

#### Dissolved Oxygen

Palmetto Railways has committed to designing culverts and/or bridges to maintain existing surface drainage patterns and to prevent erosion, limit the placement of pilings for bridges within waterways (where possible), and to design culverts (e.g., under the arrival/departure tracks ) and bridges to maintain existing flow and hydrology for wetland areas and to prevent flooding upstream. The addition of an adjacent new rail bridge over Noisette Creek under Alternative 1 (Proposed Project) would not likely result in a hydrologic constriction that could adversely impact flow patterns in

Noisette Creek. Similarly, it is unlikely that the addition of a new rail bridge over Shipyard Creek for the drayage road would adversely impact flow patterns. The construction of arrival/departure tracks crossing tidal marsh habitat upstream of Shipyard Creek, however, may slightly reduce localized tidal flushing, resulting in the potential for negligible changes in the range of BOD and salinity levels of Shipyard Creek.

Pollutant loading, which can increase the BOD and result in decreased DO, may increase locally due to rail traffic crossing respective sections of Noisette Creek. Short-term effects may be experienced upstream through the transport of pollutants during incoming tides. In addition, pollutant loading, including increased nutrient concentrations from stormwater runoff resulting from land use changes, is a possibility; however, the incorporation of the four proposed dry detention ponds and the inclusion of forebays in the proposed stormwater management system would provide pretreatment of stormwater runoff before it discharges to the primary water quantity and quality control. The detention ponds would result in a reduction of TN, TP, and TSS as compared to existing and future without-project conditions. As with the No-Action Alternative, all design requirements would need to be in compliance with the TMDL for DO established for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a; City of North Charleston 2008b) and State regulations (SCDHEC 2012c). As a result, Alternative 1 (Proposed Project) is expected to cause negligible decreases in DO conditions throughout the study area, and minor beneficial increases in runoff quality contributing to surface waters due to implementation of current stormwater BMP requirements and the construction of detention ponds.

### Salinity

Construction of the bridges associated with the drayage road over Shipyard Creek, as well as new arrival/departure tracks across the creek's associated tidal salt marsh, would not result in channel impacts that would significantly change circulation patterns. Similarly, the construction of a new rail bridge over Noisette Creek would not significantly impact the channel or cause changes in circulation patterns. As a result, potential changes to existing salinity gradients within Noisette Creek and Shipyard Creek under Alternative 1 (Proposed Project) would be negligible.

### Total Suspended Solids and Turbidity

As with the No-Action Alternative, TSS and turbidity levels in Shipyard and Noisette Creeks may increase temporarily due to stormwater runoff from disturbed lands during upland construction activities under Alternative 1 (Proposed Project). Similarly, temporary increases in TSS and turbidity are expected due to the disturbance of the bottoms and banks of Shipyard and Noisette Creeks during construction of the drayage road over Shipyard Creek and construction of a new rail bridge over Noisette Creek. Palmetto Railways' implementation of dust control measures for roads and construction areas (e.g., watering unpaved work areas, temporary and permanent seeding and mulching, covering stockpiled materials, using covered haul trucks) as well as surface water

monitoring and the use of appropriate temporary stormwater management/erosion control BMPs would result in negligible to minor, localized impacts to surface waters during construction.

Long-term impacts to TSS and turbidity levels in Shipyard Creek and the Lower Cooper River under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. Pollutant removal estimates for typical dry detention ponds suggest that between 45 and 68 percent of TSS would be removed from stormwater before discharge to surface waters (Table 4.3-2; SCDHEC 2005a). The GIS-based Pollutant Loading Model (PBS&J 2010) implemented specifically for this project site indicates that the use of the four ponds, designed in compliance with State regulations (SCDHEC 2011, SCDHEC 2012c) would result in an 86 percent reduction in TSS at the project site. In addition, potential adverse impacts would be reduced through use of a SWPPP and Stormwater Master Plan. As stormwater treatment does not currently exist on the project site, the addition of stormwater management practices (e.g., use of pretreatment and four stormwater detention ponds with a sediment forebay) would result in a beneficial impact through minor to moderate reductions in suspended sediment concentrations in Shipyard Creek and the Lower Cooper River.

### Nutrients

Impacts to nutrient concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River as a result of the project site under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. The four stormwater detention ponds surrounding the project site would be designed to remove 19 to 29 percent of the TN and 14 to 25 percent of the TP (Table 4.3-2; SCDHEC 2005a) from stormwater before discharge to surface waters. The GIS-based Pollutant Loading Model (PBS&J 2010) implemented for this site shows that the four detention ponds would reduce TN and TP concentrations by approximately 32 and 52 percent, respectively. As there is currently no stormwater treatment provided on the site, the addition of these stormwater management practices and the implementation of the local TMDL for DO (SCDHEC 2013a) would result in a beneficial impact through minor to moderate reductions in nutrient concentrations in Shipyard Creek and the Lower Cooper River.

### Bacteria

Impacts to bacteria concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. The four dry detention ponds surrounding the project site would be expected to remove between 20 and 50 percent of the bacteria and pathogens from stormwater before discharging to surface waters (Table 4.3-2; SCDHEC 2005a). As a result, there would be a negligible effect of bacteria in the surface waters of Shipyard Creek and the Lower Cooper River.

## Heavy Metals and Other Toxic Contaminants

Impacts to heavy metals and other toxic contaminants in Shipyard Creek, Noisette Creek, and the Lower Cooper River under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. In addition, release of sequestered contaminants from sediments may occur during construction of the drayage road over Shipyard Creek and from construction of a new rail bridge over Noisette Creek. According to pollutant removal estimates for standard BMPs, the vegetated swale that would be used to treat runoff from the track and ballast sections of the Proposed Project would provide 40 to 50 percent removal efficiency of metals (Table 4.3-2; SCDHEC 2005b) prior to discharge to the Lower Cooper River. In addition, roadway runoff, including flow from the McMillan Avenue Bridge, is primarily expected to be directed to the forebay and four proposed onsite dry detention ponds. Deck runoff from the drayage road bridges would be discharged via scuppers, with the exception of sections located over open waters, where runoff would be carried along the bridge length to scuppers located outside of open water limits. The four proposed stormwater treatment ponds would each remove an average of 41 percent of the heavy metal pollutants (Table 4.3-2; SCDHEC 2005b) prior to discharge to the surface waters of the Lower Cooper River. Additionally, an oil/water separator would be employed at the locomotive shop and “repair in place” tracks to ensure treatment of oily waste from on-terminal equipment maintenance activities. Assuming the separators are part of the stormwater management system prior to discharge, they would be included in the Individual Section 402 NPDES permit for the facility. Adverse impacts also would be minimized through the actions identified in the mandatory SWPPP and Stormwater Master Plan. As there is no stormwater treatment currently on the site, only minor increases in the concentrations of heavy metals and other toxic contaminants contributed to Shipyard Creek and the Lower Cooper River would occur under Alternative 1 (Proposed Project), resulting in a negligible to minor adverse impact.

Construction in areas involving contaminated soils would require testing and proper disposal of the soils if regulatory thresholds are exceeded. This would minimize any resulting transport of contaminants to surface waters during rainfall events. In addition, runoff would be directed to onsite stormwater management facilities for treatment, in compliance with State and local stormwater regulations, before discharging to surface waters. Clean fill would be used on the project site, which would then predominantly be capped with pavement to mitigate the spread of existing contaminants during operation activities.

### 4.3.3.2 Accidental Spills

Impacts to surface waters from accidental spills under Alternative 1 (Proposed Project) are expected to be similar to those under the No-Action Alternative.

### 4.3.3.3 Stormwater Runoff

Impacts from stormwater runoff during construction of Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. The addition of impervious surface and other watershed alterations, which can decrease soil permeability and vegetative cover, would increase runoff quantity and associated nps pollutant concentrations. Although there would be an increase in impervious surface, Alternative 1 (Proposed Project) includes the addition of four stormwater treatment ponds to detain and treat runoff, thereby improving water quality on the site. A sediment forebay would also be included in the stormwater management system to provide pretreatment of stormwater runoff before it discharges to the primary water quantity and quality control structure. A sediment forebay is a settling basin constructed at the incoming discharge points of a stormwater BMP. The purpose of a sediment forebay is to allow sediment to settle from the incoming stormwater runoff before it is delivered to the balance of the BMP. A sediment forebay helps to isolate the sediment deposition in an accessible area, which facilitates BMP maintenance efforts.

Increased vehicular and rail traffic and operating equipment associated with Alternative 1 (Proposed Project) would also contribute various pollutants to stormwater runoff, as described under the No-Action Alternative.

#### Stormwater Management at the Proposed Project

Under Alternative 1 (Proposed Project), stormwater from the proposed facility would be collected by a network of pipes and inlets and routed to a forebay before discharging into the four dry detention ponds located at the topographical low points of the site and in close proximity to the existing outfalls. Two ponds each would be constructed along the east (Ponds B and C) and west (Ponds A and D) sides of the facility (Figure 4.3-1). It is expected that the ponds would be sized to temporarily store the run-off volume to reduce the post-development peak flow to pre-development conditions and meet water quality requirements. Currently, there is no treatment on the project site; post-construction SWM facility treatment would exceed pre-development treatment levels. Load reduction estimates for the BMP pond treatment was assumed consistent with State regulations (SCDHEC 2011, SCDHEC 2012c). The stormwater runoff would be temporarily detained as per State standards and released through outfall structures, each including a small orifice at the bottom pond elevation to sufficiently drain the dry detention pond. The treated water would then discharge into the existing box culvert that outfalls into the Lower Cooper River at the east end of Supply Street. Based on a review of historic groundwater elevations by Palmetto Railways has been determined that the proposed elevations for the dry detention ponds allow for sufficient elevations difference between groundwater and pond bottom. As a result, the ponds would not be lined (pers. comm., Matthew Gehman, TranSystems, February 22, 2016).



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# NAVY BASE ICTF EIS

Locations of Dry  
Detention Sites  
Alternative 1 (Proposed Project)  
Figure 4.3-1





At a minimum, each pond would be designed to store and release the first 1 inch of runoff from the project site over a minimum period of 24 hours. As per City of North Charleston standards (2008b), the minimum designed sediment removal efficiency for each pond would be 80 percent suspended solids. The design storm event would be the 10-year, 24-hour design event. An emergency spillway would be included in the design to pass the 100-year storm event and to protect the area from damage during overtopping.

Stormwater management for runoff generated from the onsite roadways and railways would be provided by the forebay, four detention ponds and vegetated swales. Water from tracks and ballast sections of the project would filter through the ballast and be conveyed via sheet flow before being collected and transported to a vegetated swale on the west side of the project site. Water in the swale would be collected at grated drop inlets and fed into a pipe that outlets into a junction box at the mouth of the culvert for discharge into the Lower Cooper River. Roadway runoff, including that from the McMillan Avenue Bridge, would primarily be directed to the forebay and four dry detention ponds. Deck runoff from the drayage road bridges would be discharged via scuppers, with the exception of sections located over open waters, where runoff would be carried along the bridge length to scuppers located outside of open water limits.

Palmetto Railways has indicated that all drainage infrastructure—including forebay, ponds, outlet control structures, and storm sewers—would be constructed as part of Phase I construction. Sediment basins would be used during construction with temporary diversion ditches to divert runoff to the sediment basins. Silt fencing and other appropriate erosion control BMPs also would be used where needed.

### Pollutant Removal Efficiencies

The four dry detention ponds would serve to temporarily detain stormwater runoff from the facility and most associated roadways during and immediately following a storm event. Pollutants would be removed within the basins primarily through sedimentation during dewatering of the pond following the storm event, thereby reducing the amount of pollutants entering receiving waters. Ponds would include upstream forebays to provide pretreatment for pollutant removal. Pre-treatment serves to decrease incoming velocities and allows for the capture of coarser sediments, trash, and debris (SCDHEC 2005b). The vegetative swale would remove pollutants through filtration of particulate pollutants and infiltration of dissolved constituents. The anticipated percent pollutant removal efficiencies for dry detention and vegetative swales are presented in Table 4.3-2. A range of removal efficiencies for dry detention is presented for typical pollutants associated with stormwater; as the pollutant removal capability of vegetated filter strips (i.e., grass filters, grass filter strips, buffer strips, vegetated buffer zones, riparian vegetated buffer strips, constructed filter strips) depends upon the filter length, average removal efficiencies are reported in Table 4.3-2 (SCDHEC 2005b). Although removal efficiencies were not available for PAHs, it is anticipated that, because PAHs are often sediment-bound (Perrin 2012), some of these pollutants would be removed by the detention ponds



and vegetative swales. Further pollution loading of stormwater would be reduced through the utilization of additional BMPs, such as wet detention. Per permit conditions, the changes in surface water quality would maintain compliance with state water quality standards and impacts would be negligible.

Results of the GIS-based Pollutant Loading Model (PBS&J 2010) for calculating TN, TP, and TSS loads at the project site demonstrate that loads would be reduced by approximately 32, 52, and 86 percent, respectively, compared with the existing condition.

Table 4.3-2  
Percent Removal Estimates for Dry Detention and Vegetative Swales

Constituent	Percent Removal Efficiency (Range) for Dry Detention		Average Percent Removal Efficiency (Range) for Vegetative Filter Strips
	Low	High	Average
Total Suspended Solids	45	68	70
Total Phosphorus	14	25	10
Total Nitrogen	19	29	30
Pathogens/Bacteria	20	50	NA
Lead	31	67	—
Copper	15	38	—
Zinc	15	45	—
Metals	26	54	40-50

Source: SCDHEC (2005a)

#### 4.3.3.4 Sediments

The development of the drayage road under Alternative 1 (Proposed Project) would require bridge construction over Shipyard Creek and associated tidal marsh. Alternative 1 (Proposed Project) would also include construction of a new rail bridge over Noisette Creek. Construction of pile supports for the proposed bridges may disturb the aquatic sediments in the respective waterways. As described under the No-Action Alternative, appropriate BMPs would be employed to control the disturbance of sediments and any resulting erosion and sedimentation. Since contaminated sediments are present in the turning basin of Shipyard Creek and also are potentially present in areas farther upstream in Shipyard Creek and in Noisette Creek, appropriate BMPs may be required to control the potential release of pollutants into the water column during construction. Adverse impacts would be similar to those under the No-Action Alternative with the use of BMPs.

#### 4.3.3.5 Groundwater Resources

Impacts to groundwater recharge and quality under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative; however, multiple areas with groundwater monitoring would be impacted as well as more potentially contaminated sites. In addition, contaminated groundwater may be encountered in areas of deeper excavations (e.g., the 4 dry detention ponds, roadway and rail pilings) which would require permitting, treatment, and proper disposal of dewatering effluent as described in Section 4.15 (HTRW). With the use of avoidance and minimization measures, adverse impacts would be minor.

#### 4.3.4 Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)

Under Alternative 2, construction and operation of the Navy Base ICTF would alter the surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 1 (Proposed Project).

#### 4.3.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital)

Under Alternative 3, construction and operation of the Navy Base ICTF would alter the surface water, stormwater runoff, and sediments in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 1 (Proposed Project). Impacts to groundwater quality would be similar to the No-Action Alternative (see Section 4.15, HTRW).

#### 4.3.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

Under Alternative 4, construction and operation of the Navy Base ICTF would alter the surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 1 (Proposed Project); however, since there would not be a rail bridge over Noisette Creek for this alternative, impacts to surface waters of Noisette Creek would be negligible to minor, and limited to those associated with a temporary increase in stormwater runoff from disturbed lands during upland construction activities.

### 4.3.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

#### 4.3.7.1 Surface Waters

Under Alternative 5, construction and operation activities at the River Center project site would result in impacts to surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River that are similar to the No-Action Alternative and Alternative 1 (Proposed Project), with a few exceptions. As with Alternative 1 (Proposed Project), stormwater treatment does not currently exist on the River Center project site. The addition of stormwater management practices under Alternative 5 would be similar to those under Alternative 1 (Proposed Project), including the use of pre-treatment and four dry detention ponds located at the topographical low points of the River Center project site and in close proximity to the existing outfalls (Figure 4.3-2). In addition, like the project site, the River Center project site would discharge either directly or indirectly into the Cooper River. As such, all design requirements would need to be in compliance with the TMDL for DO established for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a; City of North Charleston 2008b) and State regulations (SCDHEC 2012c). Potential impacts to water quality are discussed in the following sub-sections and are evaluated with respect to the status of the current TMDL for DO (SCDHEC 2013a).

#### Dissolved Oxygen, Salinity, and Bacteria

Construction and operation of the River Center ICTF at the River Center project site under Alternative 5 would not introduce any new elements that would appreciably change circulation patterns of, or pollutant loading to, surface waters as compared to Alternative 1 (Proposed Project). As a result, associated impacts to DO and salinity concentrations as well as bacteria in surface waters would be the same as those under Alternative 1 (Proposed Project).

#### Total Suspended Solids and Turbidity

Impacts to TSS and turbidity in Noisette and Shipyard Creeks for the River Center project site under Alternative 5 would be similar to those under Alternative 1 (Proposed Project).

The GIS-based Pollutant Loading Model (PBS&J 2010) implemented for the River Center project site indicates that the use of BMPs similar to those proposed for Alternative 1 (Proposed Project) during operation would result in a 71 percent reduction in TSS. The resulting discharge would have similar levels of TSS as Alternative 1 (Proposed Project) and lower levels of TSS than the existing condition.

The increased distance of the drayage road and number of yard trucks required for the River Center project site would lead to increased quantities of stormwater runoff from the roadway and associated TSS and turbidity levels from off-site improvement areas, as compared to Alternative 1 (Proposed



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Project). Although these changes would cause a rise in stormwater runoff suspended sediment concentrations, the roadway runoff would be directed to onsite stormwater management facilities for treatment, in compliance with State and local stormwater regulations, before discharging to surface waters.

### Nutrients

Under Alternative 5, the River Center ICTF would generate approximately the same runoff nutrient load as that generated under Alternative 1 (Proposed Project). According to the GIS-based Pollutant Loading Model (PBS&J 2010) implemented for the River Center project site, the use of BMPs on this site would reduce TN and TP concentrations by approximately 36 and 47 percent, respectively (see Section 4.3.4.3). Percent reduction levels at the River Center project site would be similar to those at the project site for both TN and TP. As with Alternative 1 (Proposed Project), a beneficial impact to water quality through minor to moderate reductions in nutrient concentrations in local surface waters would occur.

The drayage road required for the River Center project site under Alternative 5 would be approximately twice as long as that for Alternative 1 (Proposed Project). This increased length would generate greater stormwater runoff nutrient pollution loading to Shipyard Creek and the Lower Cooper River than Alternative 1 (Proposed Project); however, as with Alternative 1 (Proposed Project), appropriate stormwater measures would be implemented, resulting in minimal adverse impacts to surface water quality.

### Heavy Metals and Other Toxic Contaminants

Impacts to heavy metals and other toxic contaminants in Noisette Creek for the River Center project site under Alternative 5 would be the same as those for Alternative 1 (Proposed Project). The River Center project site would involve a larger number of trucks operating along a longer drayage road. As a result, levels of oils, grease, and other toxic contaminants generated through vehicle operation—as well as fertilizers, pesticides, and herbicides used along the drayage road—would increase stormwater runoff pollution (Wilkomirski et al. 2011, Nixon and Saphores 2007). As a result, impacts to heavy metals and other toxic contaminants in Shipyard Creek and the Lower Cooper River would likely be higher than those under Alternative 1 (Proposed Project).

The use of pretreatment and stormwater treatment ponds similar to those described for Alternative 1 (Proposed Project), and other actions identified in the mandatory SWPPP, would minimize surface water impacts. As a result, impacts to water quality from concentrations of heavy metals and other toxic contaminants in surface waters for the River Center project site under Alternative 5 would be similar to those for Alternative 1 (Proposed Project).



#### 4.3.7.2 Accidental Spills

The risk of accidental spills and associated impacts under Alternative 5 would be similar to those under Alternative 1 (Proposed Project).

#### 4.3.7.3 Stormwater Runoff

Construction of a longer drayage road under Alternative 5 would involve the disturbance and transport of larger quantities of earth and sediments, resulting in a temporary increase in stormwater runoff TSS and turbidity and suspended sediments; however, as with Alternative 1 (Proposed Project), all activities would be performed in compliance with State and local stormwater regulations. Temporary sediment basins and other temporary stormwater management/erosion control BMPs would be implemented to control runoff and protect surface waters during construction. As a result, impacts to water quality from stormwater runoff during construction should be similar to those under Alternative 1 (Proposed Project).

Increased impervious surface and vehicular traffic associated with the longer drayage road from the River Center project site would generate greater runoff quantity, suspended sediment runoff pollution, and associated nps pollutant concentrations (e.g., used oils, grease, and heavy metals) contributing to surface waters than Alternative 1 (Proposed Project). Stormwater along the drayage road would be conveyed to onsite detention basins for treatment prior to discharge to surface waters. As a result, impacts to water quality associated with stormwater runoff for the River Center project site under Alternative 5 would be similar to those under Alternative 1 (Proposed Project).

Results of the GIS-based Pollutant Loading Model (PBS&J 2010) for calculating TN, TP, and TSS loads at the River Center project site demonstrate load reductions for the basin of approximately 36, 47, and 71 percent for TN, TP, and TSS, respectively. As a result, a beneficial impact to water quality would occur.

#### 4.3.7.4 Sediments

Impacts to sediments in Noisette and Shipyard Creeks for the River Center project site under Alternative 5 would be the same as those under Alternative 1 (Proposed Project).

#### 4.3.7.5 Groundwater Resources

Impacts to groundwater capacity and quality for the River Center project site under Alternative 5 would be similar to those under Alternative 1 (Proposed Project) but with fewer areas with existing groundwater contamination and monitoring wells (see Section 4.15.3, HTRW).



#### **4.3.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Under Alternative 6, construction and operation of the River Center ICTF would alter the surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 5.

#### **4.3.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

Under Alternative 7, construction and operation of the River Center ICTF would alter the surface water, stormwater runoff, and sediments in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 4. Impacts to Shipyard Creek and the Lower Cooper River associated with the increased distance of the drayage road and number of yard trucks required for the River Center project site would be similar to those under Alternative 5. Impacts to groundwater resources as a result of the River Center ICTF under Alternative 7 would also be similar to those under Alternative 5.

#### **4.3.10 Related Activities**

New track would be constructed on a section of unimproved CSX ROW to accept intermodal trains at the proposed new at-grade crossing at Meeting Street under Alternatives 1, 2, 4, 5, and 7 and would result in negligible impacts to surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity. Similarly, construction associated with Related Activities under Alternatives 3 and 6 would also result in negligible impacts to these resources.

The addition of a Related Activity involving reactivation of an out-of-service ROW and construction of a new railroad trestle bridge across a portion of marsh, which drains to Noisette Creek, under Alternative 2 would result in additional impacts to Noisette Creek surface waters. Temporary increases in TSS and turbidity are expected due to disturbance of the bottoms and banks of Noisette Creek during construction of the new railroad bridge. Release of sequestered contaminants from sediments in the Noisette Creek marsh may also occur during construction of the new railroad bridge. Since contaminated sediments are potentially present in Noisette Creek, appropriate BMPs may be required to control the potential release of pollutants into the water column during construction. Negligible decreases in DO conditions are also expected due to additional pollutant loading from increased rail traffic crossing Noisette Creek. Implementation of surface water monitoring and the use of appropriate temporary stormwater management/erosion control BMPs by the NCTC would result in negligible to minor, localized impacts to surface waters of Noisette Creek during construction.

The addition of a new railroad bridge would increase impervious surface resulting in increased stormwater runoff and associated nps pollutant concentrations into Noisette Creek; however,

implementation of onsite stormwater management practices would be in compliance with State and local stormwater regulations, the SWPPP, and Stormwater Master Plan, resulting in negligible to minor adverse impacts.

The addition of a new railroad trestle bridge across the Noisette Creek marsh as a Related Activity under Alternative 2 would also impact sediments. Construction of pile supports for the bridge may disturb aquatic sediments in Noisette Creek. Appropriate BMPs would likely be employed by the NCTC to control the disturbance of sediments and any resulting erosion and sedimentation. Adverse impacts are expected to be localized and minor.

Impacts to groundwater recharge and quality as a result of the Related Activities under Alternative 2 would be negligible.

#### 4.3.11 Summary of Impacts Table

Table 4.3-3 summarizes the environmental consequences to water quality from the No-Action Alternative, the Proposed Project (Alternatives 1 through 4), and the River Center project site alternatives (Alternatives 5 through 7).

Table 4.3-3  
Summary of Impacts, Water Quality

Alternative	Surface Water Quality Impacts	Stormwater Runoff Impacts	Sediment Quality Impacts	Groundwater Resources Impacts
<i>No-Action</i>	Negligible effect in vicinity of the project, downstream, and throughout tidal segments of on-site creeks from potential changes in runoff, watershed alterations, and increased vehicular and rail traffic. Possible beneficial effect on DO, TSS, and concentrations of nutrients, heavy metals and other toxic contaminants in downstream waters. Minor effect from accidental spills.	Negligible effect on water quality from stormwater runoff with implementation of current stormwater management practices. Possible beneficial effect on DO, TSS, and concentrations of nutrients, heavy metals and other toxic contaminants in downstream waters.	Minor effect during construction activities from disturbance of sediments and associated release of pollutants into the water column.	Negligible effect on groundwater recharge. Minor effect on groundwater quality due to excavation and use of stormwater infrastructure and ponds in vicinity of contaminated groundwater.

Alternative	Surface Water Quality Impacts	Stormwater Runoff Impacts	Sediment Quality Impacts	Groundwater Resources Impacts
1: Proposed Project: CSX – Milford / NS – North via Hospital District	Similar to the No-Action Alternative, with few exceptions. Negligible to minor temporary effect on TSS, turbidity and concentrations of heavy metals and other toxic contaminants due to disturbance of sediments in Shipyard Creek and Noisette Creek during construction.	Similar to the No-Action Alternative	Similar to the No-Action Alternative	Similar to the No-Action Alternative, but with multiple areas with groundwater monitoring that would be impacted and more potentially contaminated sites.
2: CSX – Milford / NS – S-line	Similar to Alternative 1 (Proposed Project). Impacts to surface waters may be slightly reduced as construction over Noisette Creek would be limited to a new rail bridge.	Similar to Alternative 1 (Proposed Project)	Similar to the Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
3: CSX – Kingsworth / NS – Hospital	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to the No-Action Alternative
4: CSX & NS – Milford	Similar to Alternative 1 (Proposed Project). Impacts to surface waters of Noisette Creek would be negligible to minor and limited to those associated with a temporary increase in stormwater runoff from disturbed lands during upland construction activities.	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)



Alternative	Surface Water Quality Impacts	Stormwater Runoff Impacts	Sediment Quality Impacts	Groundwater Resources Impacts
5: River Center Project Site: CSX – Milford / NS – North via Hospital District	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) but with fewer areas with existing groundwater contamination and monitoring wells.
6: River Center Project Site: CSX – Kingsworth / NS – Hospital	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5 but with 12 fewer potentially contaminated sites impacted.
7: River Center Project Site: CSX & NS – Milford	Similar to Alternative 4	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5

### 4.3.12 Mitigation

#### 4.3.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Comply with requirements of the Individual Section 402 NPDES permit, including applicable groundwater and surface monitoring. (Minimization)
- Employ the use of oil-water separators at the locomotive shop and "Repair in Place" tracks to ensure treatment of any oily waste from on-terminal equipment maintenance activities. Assuming the separators are part of the treatment system prior to discharge to the stormwater management system, they would be included in the required Individual Section 402 NPDES permit for the facility. (Minimization)
- Implement a SWPPP and Stormwater Master Plan as required by the Individual Section 402 NPDES permit. (Minimization)
- Inclusion of sediment forebay in stormwater management system to provide pretreatment of stormwater runoff before it discharges to the primary water quantity and quality control BMP. (Minimization)

- Construct four stormwater detention ponds located at the topographical low points of the site and in close proximity to the existing outfalls to contain and manage stormwater runoff. Two ponds each would be constructed along the east (Ponds B and C) and west (Ponds A and D) sides of the facility (see Figure 4.3-1). It is expected that the ponds would be sized to temporarily store the run-off volume to reduce the post-development peak flow to pre-development conditions and meet water quality requirements. (Minimization)
- Implement sediment and erosion control measures to mitigate sediment and sediment-associated pollutant loading from disturbed areas. (Minimization)
- Cap much of the project site with pavement to mitigate spread of existing contaminants. (Minimization)
- Implement dust control measures for roads and construction areas (such as watering unpaved work areas, temporary and permanent seeding and mulching, covering stockpiled materials, and using covered haul trucks). (Minimization)
- Use clean fill material. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to water quality is also provided in Chapter 6.

#### **4.3.12.2 Additional Potential Mitigation Measures**

No additional mitigation measures are proposed for Water Quality by the Corps.

## 4.4 VEGETATION AND WILDLIFE

This section describes the potential impacts of the Proposed Project on terrestrial vegetation and wildlife resources in the Vegetation and Wildlife study area. Impacts on terrestrial vegetation include clearing and removal of natural and previously disturbed land cover types and direct and indirect impacts on wildlife and/or their habitat during construction and operation of the Navy Base ICTF.

### 4.4.1 Methods and Impact Definitions

Impacts to vegetation and wildlife were evaluated through GIS analyses of land cover types and species richness that were verified during the field surveys. The impact evaluation considers both construction and operation activities for the Navy Base ICTF within the Vegetation and Wildlife study area, and evaluates potential impacts related to habitat loss; alteration, and/or fragmentation; displacement and/or mortality of wildlife species; and the introduction of invasive, noxious weeds, and non-native species. The type and severity of impacts on terrestrial resources depend on the characteristics of the disturbance (type, timing, and duration); where the disturbance occurs (the habitat type present and existing site characteristics); and the species present, and their sensitivity, habituation, and resilience to disturbance (Table 4.4-1).

Anticipated changes in the existing conditions for terrestrial resources in the Vegetation and Wildlife study area under each alternative were identified and assessed quantitatively for resources for which quantitative data were available, including land cover types, wildlife habitat, and raptor nests. For terrestrial resources where no quantitative data were available, impacts are described qualitatively.

Table 4.4-1  
Impact Definitions, Vegetation and Wildlife

	Negligible	Minor	Major
<b>Vegetation</b>	No impacts to vegetation or plant communities	Alteration in vegetation or plant communities (habitat) that sustain animal populations; fragmentation of habitat that impairs existing plant communities; localized occurrences of invasive, noxious weeds.	Loss of vegetation or plant communities (habitat) that degrade the stability of animal populations; fragmentation of habitat that results in the loss of plant communities; widespread occurrences of invasive, noxious weeds.



	Negligible	Minor	Major
<b>Wildlife</b>	No impacts to wildlife	Temporary displacement of wildlife species; mortality of individuals of common wildlife species; fragmentation of populations of distinct wildlife species; temporary impairment to animal migratory paths; localized occurrences of non-native wildlife species.	Permanent impairment to animal migratory paths; mortality of a distinct population of common wildlife species; destruction of wildlife breeding grounds/nesting areas (e.g., rookeries); introduction and uncontrollable spread of non-native wildlife species

#### 4.4.2 No-Action Alternative

Under the No-Action Alternative, the Corps would not issue a DA permit, and construction and operation of the Navy Base ICTF would not occur. For the purposes of this EIS, it is assumed that the project site and the River Center project site would continue to include mixed use (residential and commercial) and industrial land uses. In light of Palmetto Railways' ownership of the properties, there would be the potential for redevelopment of these areas to include rail-served warehousing and distribution. While future land uses and human activities may occur adjacent to and/or within the vegetation cover types and wildlife habitat within the study area, it would be speculative to attempt to estimate the acreage of impacts to vegetation at this time.

Under the No-Action Alternative, the existing habitat conditions for terrestrial wildlife in the study area generally would be expected to continue (Figure 3.4-1). The existing habitats in the study area are fragmented due to the CNC and adjacent mixed residential and commercial land uses within portions of both the City of North Charleston and the City of Charleston. Habitat fragmentation refers to the division of large, contiguous blocks of habitat into smaller, more isolated parcels that are less suitable for wildlife.

Upland areas within the study area generally are fragmented and disturbed, and are inhabited by plant and animal species that are adapted to these conditions. Additional upland fragmentation is likely to continue as a result of additional growth and re-development of existing fallow areas over time. Routine maintenance (mowing and cutting) throughout the study area results in a lack of regeneration of vegetation. Without any comprehensive development plans, the No-Action Alternative would assume these areas to be unchanged.

While there are numerous wildlife species that may inhabit the terrestrial and aquatic habitats within the study area (invertebrates, insects, reptiles, amphibians, birds, fishes, marine mammals, and mammals), existing and future land uses proposed under the No-Action Alternative are not expected to directly (or indirectly) result in the displacement and/or mortality of these species and/or their

associated habitats. As a result, there would be no major adverse impacts to wildlife species under the No-Action Alternative.

### **4.4.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)**

#### **4.4.3.1 Construction Impacts**

Construction of Alternative 1 (Proposed Project) would permanently disturb approximately 213.51 acres of vegetation (vegetative land cover classes as described in Section 3.4) within the limits of construction of the study area due to clearing and grading activities. Approximately 95.0 percent of the total area to be disturbed (202.91 acres) would affect previously disturbed communities. Developed areas lack any significant natural vegetation communities. Approximately 5.0 percent (10.6 acres of the total area to be disturbed) would affect natural communities, including marsh and marine water. As shown in Figure 4.4-1, Alternative 1 (Proposed Project) would permanently alter approximately 213.51 acres of upland terrestrial habitat and 10.6 acres of aquatic habitat (Table 4.4-2).

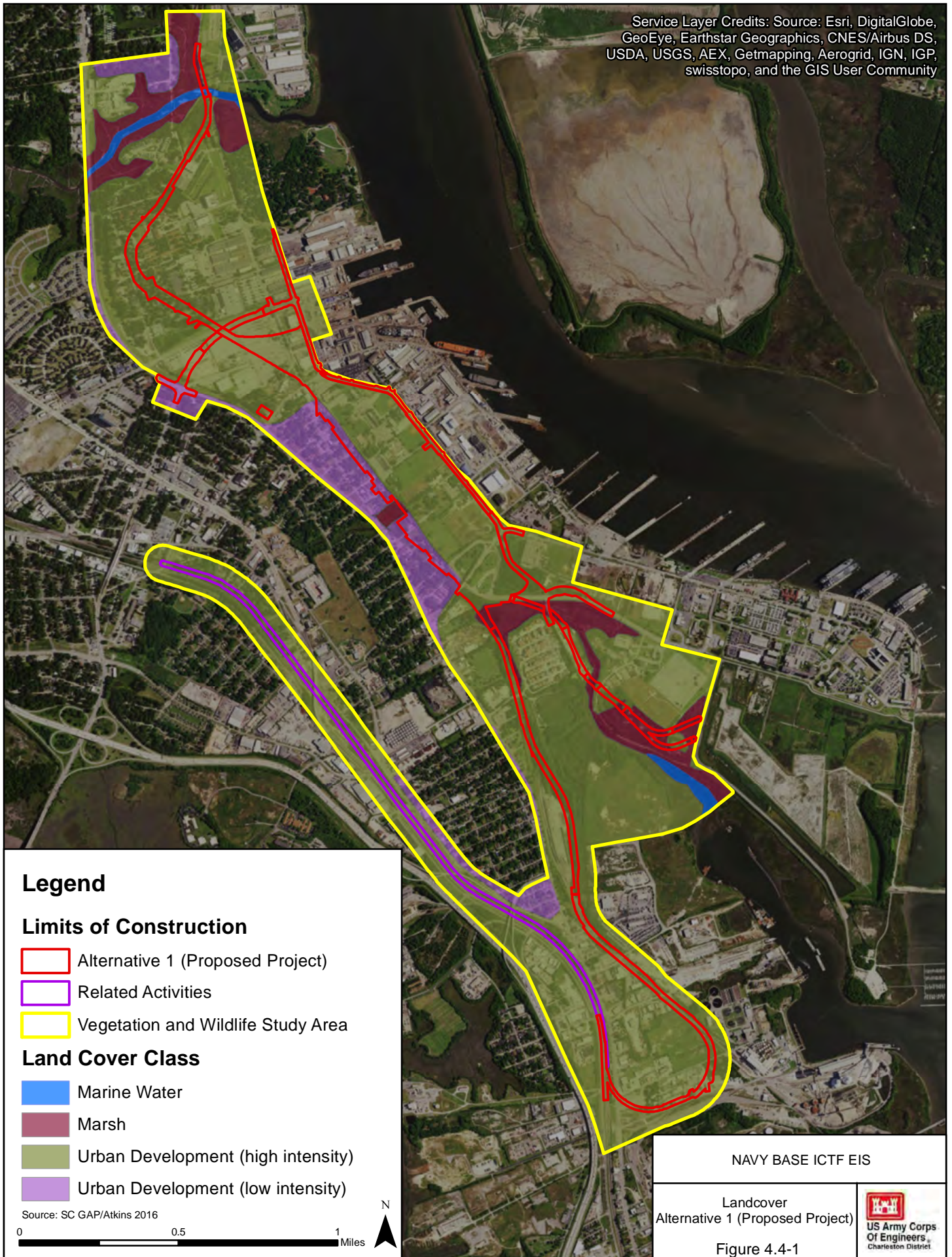
Where feasible, all road and rail improvements would be made in upland habitat to avoid and minimize impacts to aquatic plant communities. Access bridges and approaches would result in some fill, pile driving, and shading impacts to open marine waters and marshes (Figure 4.4-1). The drayage road for Alternative 1 (Proposed Project) would result in direct loss of aquatic habitat where the roadway corridor traverses marshes. All other impacts are to disturbed/maintained uplands. In most instances, bridges and roadways would be elevated to avoid impacts to aquatic habitat and other natural resources. Where the road and rail bridges are at low elevations relative to the existing ground, some shading and loss of aquatic resource functions would occur.

Construction of the Proposed Project would require placement of fill and structures in tidal and non-tidal wetlands and impacts to terrestrial habitat. By locating the ICTF at a previously disturbed area, impacts to undeveloped land are reduced. The same approach is applied to redeveloping roadways and railways within fallow areas previously used in development that are no longer in service. The construction of this alternative would impact mostly urban developed areas (industrial areas and existing road and rail right of ways) (Figure 4.4-1).

Specific activities associated with Alternative 1 (Proposed Project) could result in temporary displacement of individuals and/or permanent alterations to habitat including the construction of the drayage road and arrival/departure tracks in nearby marshes of Shipyard and Noisette creeks (permanent physical alterations to habitat and fragmentation), bridge improvements in Noisette Creek (permanent shading, temporary noise and sedimentation), and bridge construction in Shipyard Creek (permanent shading, temporary noise and sedimentation).



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The removal of vegetation can cause increased erosion of soil on areas without the vegetative material to intercept rainfall, reduce runoff and stabilize soil, as addressed in Section 4.1, “Geology and Soils.” Areas without well-established vegetation would be susceptible to invasion by weeds, including invasive or noxious species, because these species are typically adapted to primary succession on bare soil; however, the Corps’-proposed mitigation measure to spray disturbed areas to prevent the establishment of invasive, noxious weeds would minimize the potential for their establishment.

Construction and operation of the Proposed Project would generate dust that could be dispersed beyond the areas cleared of vegetation. Dust settling on vegetation close to dust-generating activities (e.g., roads) may reduce cover and productivity of the vegetation through disruption of photosynthesis and reproduction processes; however, this potential impact would be a temporary impact and would be reduced through the use of dust suppression BMPs as proposed by Palmetto Railways (see Section 4.13, Air Quality, for additional information on dust generation and dispersion).

Habitat fragmentation would result from removal of vegetation and loss of habitat during construction of the ICTF facilities and from human disturbance during operation of the Navy Base ICTF. Because the existing habitat in the study area is already fragmented, additional fragmentation during construction of the Proposed Project would cause a minor temporary impact on wildlife.

Vegetation clearing would result in direct minor impacts on avian habitat by eliminating existing vegetation, including habitat for birds protected under the MBTA. Of all habitats surveyed, the highest number of bird species was observed in the previously disturbed habitat type, which was dominated by American crow, Carolina wren, and laughing gull. These species also were dominant in all other habitats surveyed in the study area. Similar-quality habitat will redevelop within temporary disturbance footprints at the completion of the construction of the project. Raptors, such as red-shouldered hawks and turkey vultures, were observed hunting in the study area. The presence of adjacent suitable habitats will likely mean Alternative 1 (Proposed Project) will have minimal impact to these raptors. Given the lack of suitable nesting and foraging habitat throughout the study area, and no observations of raptors or their nests during the field surveys, potential impacts on raptors and other large birds would be temporary and minor.

Indirect impacts on birds may include disturbance from human activities such as noise. Birds are expected to avoid construction areas and are highly mobile, able to move quickly away from disturbance. The distance avoided would depend on many factors, including the type, timing, season, and duration of human activity; the type of habitat adjacent to the activity; and the sensitivity and tolerance of the birds affected. The majority of bird species currently present (American crow, northern cardinal, northern mockingbird, mourning dove, blue jay, Carolina wren, buntings, and sparrows) commonly inhabit previously disturbed habitats. These common species are relatively

abundant, and are adapted to living in close association with human activity and infrastructure. As such, indirect impacts on birds from human disturbance are expected to be temporary and minor.

Vegetation clearing would result in direct minor impacts on wildlife habitat by eliminating existing vegetation. The species currently present are those that have adapted to using previously disturbed habitats, as demonstrated by their presence in these areas. Because most mammals observed (white-tailed deer, beaver, raccoon, opossum, eastern gray squirrel, and eastern cottontail rabbit) during surveys in the study area were found in the previously disturbed vegetation types, the impact would be minor, given the relative abundance of suitable habitat in the surrounding area compared to the availability of such habitat in the study area.

Indirect impacts on mammals may include disturbance from human activities such as noise. Most of the species present in the study area occupy previously disturbed habitats, are relatively abundant common species, and are adapted to living in close association with human activity and infrastructure. As such, indirect impacts on wildlife from human disturbance are expected to be temporary and minor.

Aquatic species known to occur in the study area include sea worms, small crustaceans, snails, shellfish, shrimp, squid, blue crab, finfish, reptiles, and amphibians. Short-term impacts on these species from construction of Alternative 1 (Proposed Project) include turbidity, high sedimentation, and chemical contamination. Potential long-term impacts include the permanent loss of open marine waters and associated marshes that provide nesting and foraging habitat. Existing reptiles and amphibians expected to inhabit the study area are abundant and common species, so any decrease in their abundance due to reduction of habitat from construction of Alternative 1 (Proposed Project) would not threaten the general population of these species or their predators.

Finfish have high mobility and are capable of avoiding construction impacts (excavation and filling). Elevated suspended sediment levels could potentially impact foraging during construction. Most non-schooling fish are attracted to structures for cover/shelter, as well as substrate from which to forage for invertebrates, algae, etc. Therefore, some fish species would likely be positively impacted by the installation of pilings and structures as part of Alternative 1 (Proposed Project) and the associated sessile epifauna that will be attracted to them.

Injury or mortality of mammals, birds, and other small animals could occur through direct contact with construction equipment, traffic, and toxic materials. Wildlife would likely move away from the limits of construction in the presence of human activity, which would decrease the potential for direct contact with construction equipment and traffic. In addition, large equipment would move slowly through the area, which would reduce the potential for collisions with wildlife. Direct impacts would occur only in the areas directly affected by construction activities. Although individuals could be affected, entire populations would not, resulting in minor temporary impacts on wildlife from contact with construction equipment.

Due to the potential impacts to nesting and foraging habitat for fishes, marine reptiles, and marine mammals; adverse impacts resulting from construction of Alternative 1 (Proposed Project) could be minimized by adhering to environmental work windows that are established by the Corps, which restricts construction to periods when wildlife are least abundant or least likely to be affected by filling and pile installation activities. The environmental work windows for in-water construction have targeted winter months, because wildlife abundance is dramatically reduced during colder water temperatures. Potential impacts to federal- and state-listed threatened and endangered species and mitigation are discussed in Sections 4.6 and 4.7.

#### 4.4.3.2 Operation and Maintenance Impacts

Long-term impacts associated with Alternative 1 (Proposed Project) include maintenance of vegetation that was removed during construction and long-term increases in road and rail traffic. Alternative 1 (Proposed Project) would increase future rail traffic, thereby increasing the chance for an accidental release of exotic species into the environment. Impacts to the project site are anticipated to be minimal due to the existing upland habitats at the site supporting many introduced invasive plant and animal species, including Japanese privet, Japanese honeysuckle, kudzu, red fire ants, and the Asian long-horned beetle.

Table 4.4-2  
Land Cover Impacts for Alternative 1: Proposed Project

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Cosgrove/McMillan Overpass	Shading	–	–	2.56	2.56	1.20
Cosgrove/McMillan/Hobson Realignment	Fill	–	–	14.97	14.97	7.01
Drayage Road	Fill	1.27	–	2.68	3.95	1.85
Drayage Road Bridges	Shading	4.77	–	1.64	6.40	3.0
Hobson/Bainbridge Realignment	Fill	0.78	–	9.17	9.95	466
ICTF	Fill	1.63	–	129.26	130.89	61.30
Northern Connection	Fill	0.95	0.03	16.68	17.67	8.27
Noisette Bridge	Shading	–	0.27	0.06	0.32	0.15
Southern Connection	Fill	0.90	–	25.20	26.10	12.22
Substation	Fill	–	–	0.70	0.70	0.33
<b>Total*</b>		<b>10.31</b>	<b>0.29</b>	<b>202.91</b>	<b>213.51</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.



#### 4.4.4 Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)

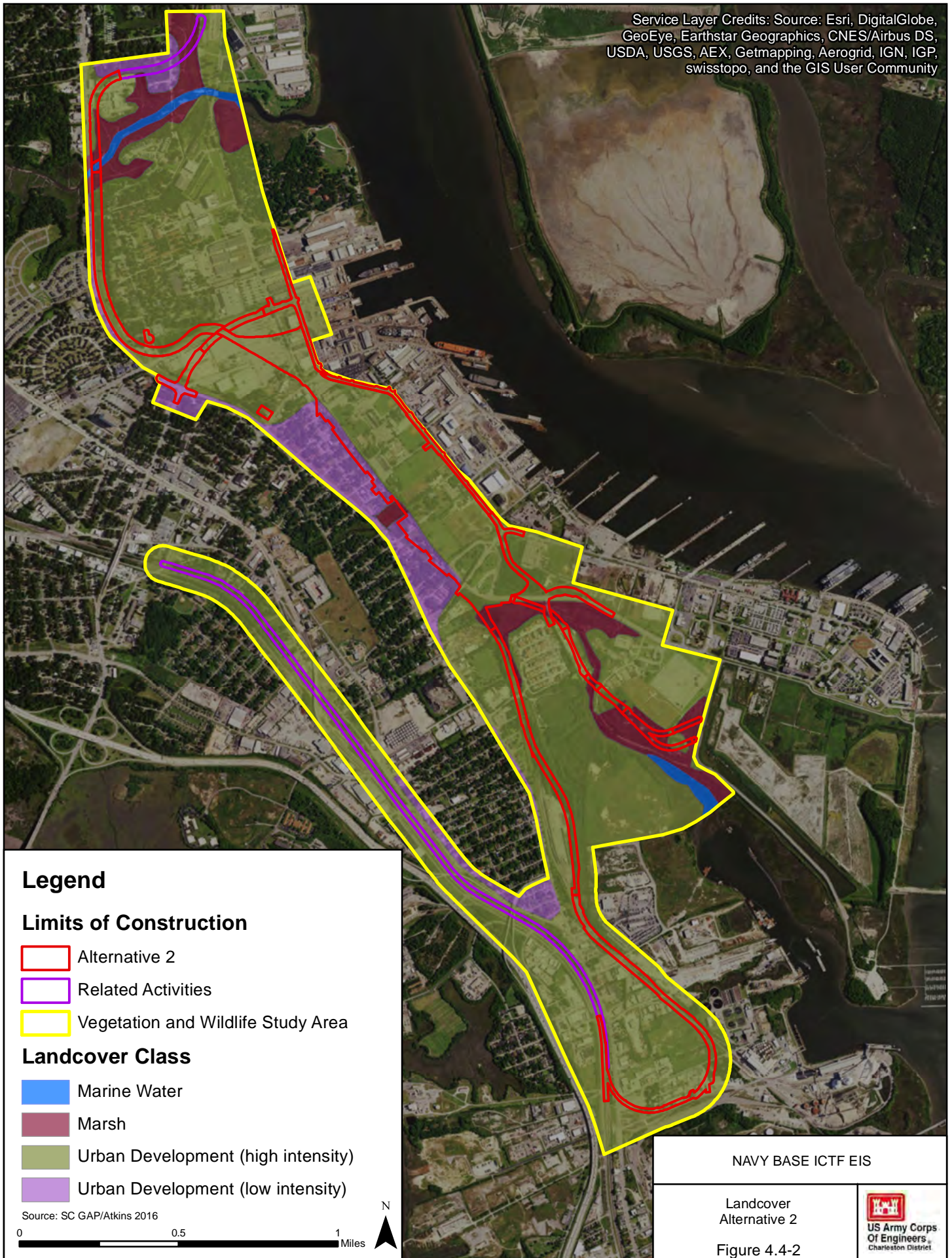
Alternative 2 is a variation of Alternative 1 (Proposed Project) where the northern rail connection for NS would be relocated along Spruill Avenue within existing CSX ROW to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the NS Northern Rail Connection alignment. Alternative 2 would require a bridge crossing of Noisette Creek adjacent to Spruill Avenue, rather than near Noisette Boulevard (Figure 4.4-2).

Habitat alteration, habitat fragmentation, introduction of invasive/noxious species, species displacement, and species mortality impacts to vegetation and wildlife under Alternative 2 are expected to be minor which is similar to those discussed under Alternative 1 (Proposed Project); however, the exception would be additional fill, pile driving, and shading impacts to aquatic species and marine and tidal salt marsh habitat associated with the construction of the rail bridge crossing Noisette Creek along Spruill Avenue. Construction of Alternative 2 would permanently disturb approximately 217.49 acres of vegetation within the limits of construction of the study area. As shown in Figure 4.4-2, Alternative 2 would permanently alter approximately 204.92 acres of upland terrestrial habitat and 12.57 acres of tidal aquatic habitat (Table 4.4-3).

Table 4.4-3  
Land Cover Impacts for Alternative 2

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Cosgrove/McMillan Overpass	Shading	–	–	2.54	2.54	1.17
Cosgrove/McMillan/Hobson Realignment	Fill	–	–	14.97	14.97	6.88
Drayage Road	Fill	1.27	–	2.68	3.95	1.81
Drayage Road Bridges	Shading	4.77	–	1.64	6.41	2.95
Hobson/Bainbridge Realignment	Fill	0.78	–	9.17	9.96	4.58
ICTF	Fill	1.63	–	129.28	130.91	60.19
Northern Connection	Fill	2.59	0.00	18.24	20.84	9.58
Noisette Bridge	Shading	0.27	0.35	–	0.62	0.28
Southern Connection	Fill	0.90	–	25.20	26.10	12.00
Substation	Fill	–	–	0.51	0.51	0.23
St. Johns cul-de-sac	Fill	–	–	0.70	0.70	0.32
<b>Total*</b>		<b>12.21</b>	<b>0.36</b>	<b>204.92</b>	<b>217.49</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.





#### 4.4.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

Alternative 3 is a variation of Alternative 1 (Proposed Project) where the southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW). Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the CSX Southern Rail Connection alignments (Figure 4.4-3).

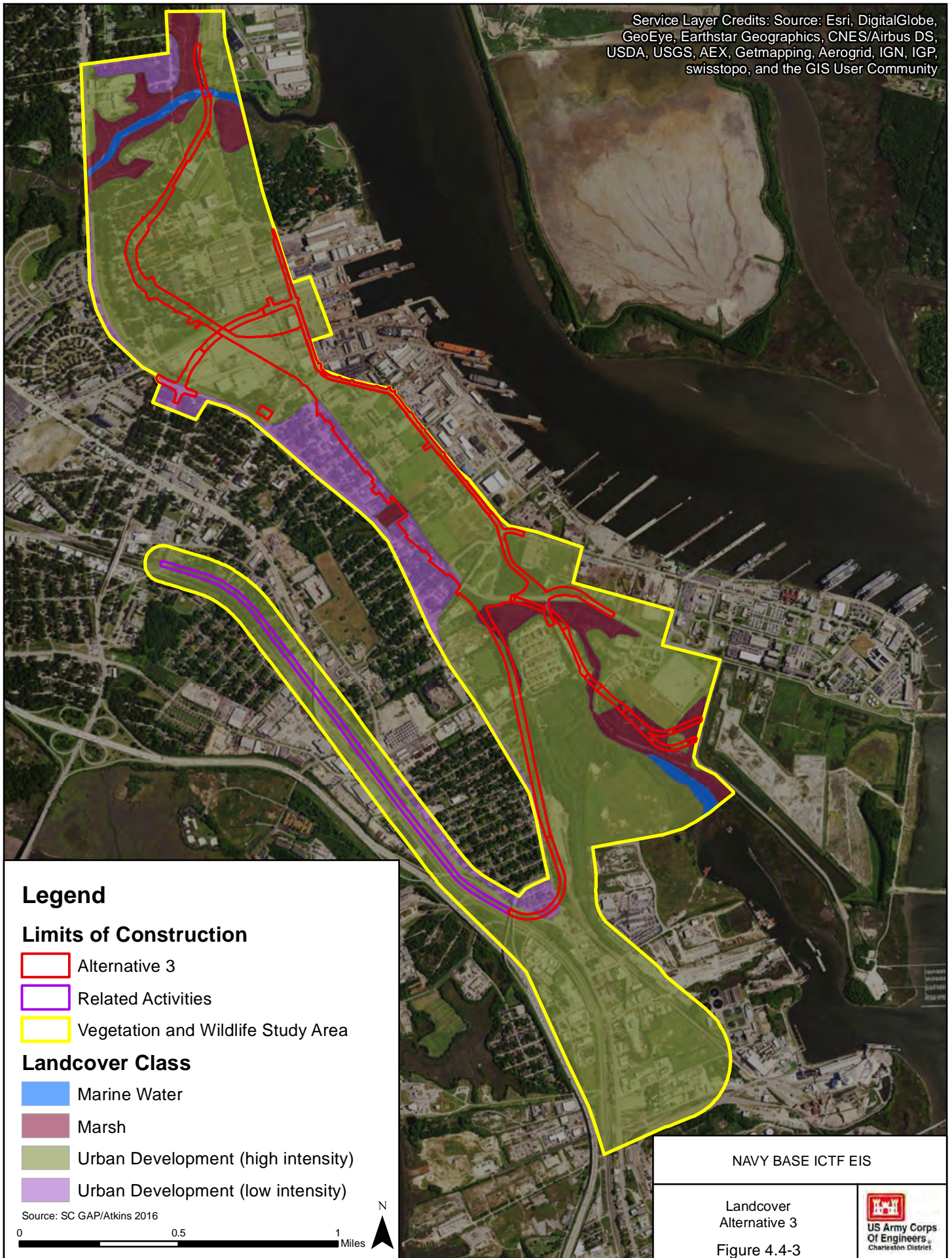
Habitat alteration, habitat fragmentation, introduction of invasive/noxious species, species displacement, and species mortality impacts to vegetation and wildlife under Alternative 3 are expected to be minor which is similar to those discussed under Alternative 1 (Proposed Project); however, the exception would be small additional fill impacts to aquatic species and marsh habitat associated with the Kingsworth Avenue Southern Rail Connection. Construction of Alternative 3 would permanently disturb approximately 200.87 acres of vegetation within the limits of construction of the study area. As shown in Figure 4.4-3, Alternative 3 would permanently alter approximately 190.04 acres of upland terrestrial habitat and 10.83 acres of tidal aquatic habitat (Table 4.4-4).

Table 4.4-4  
Land Cover Impacts Alternative 3

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Cosgrove/McMillan Overpass	Shading	–	–	2.56	2.56	1.28
Cosgrove/McMillan/Hobson Realignment	Fill	–	–	14.96	14.96	7.45
Drayage Road	Fill	1.27	–	2.68	3.95	1.97
Drayage Road Bridges	Shading	4.77	–	1.64	6.40	3.19
Hobson/Bainbridge Realignment	Fill	0.78	–	9.17	9.96	4.96
ICTF	Fill	1.63	–	129.26	130.89	65.16
Northern Connection	Fill	0.95	0.03	16.68	17.67	8.79
Noisette Bridge	Shading	–	0.27	0.06	0.32	0.16
Southern Connection	Fill	1.14	–	12.33	13.46	6.70
Substation	Fill	–	–	0.70	0.70	0.35
<b>Total*</b>		<b>10.54</b>	<b>0.29</b>	<b>190.04</b>	<b>200.87</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.





#### 4.4.6 Alternative 4: Proposed Project Site (CSX: & NS – South via Milford)

Alternative 4 is a variation of Alternative 1 (Proposed Project) where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection, with NS connecting to an existing NS rail line near Milford Street (and adjacent to existing CSX rail and ROW). Proposed rail through the Hospital District would stop short of Noisette Creek (Figure 4.4-4).

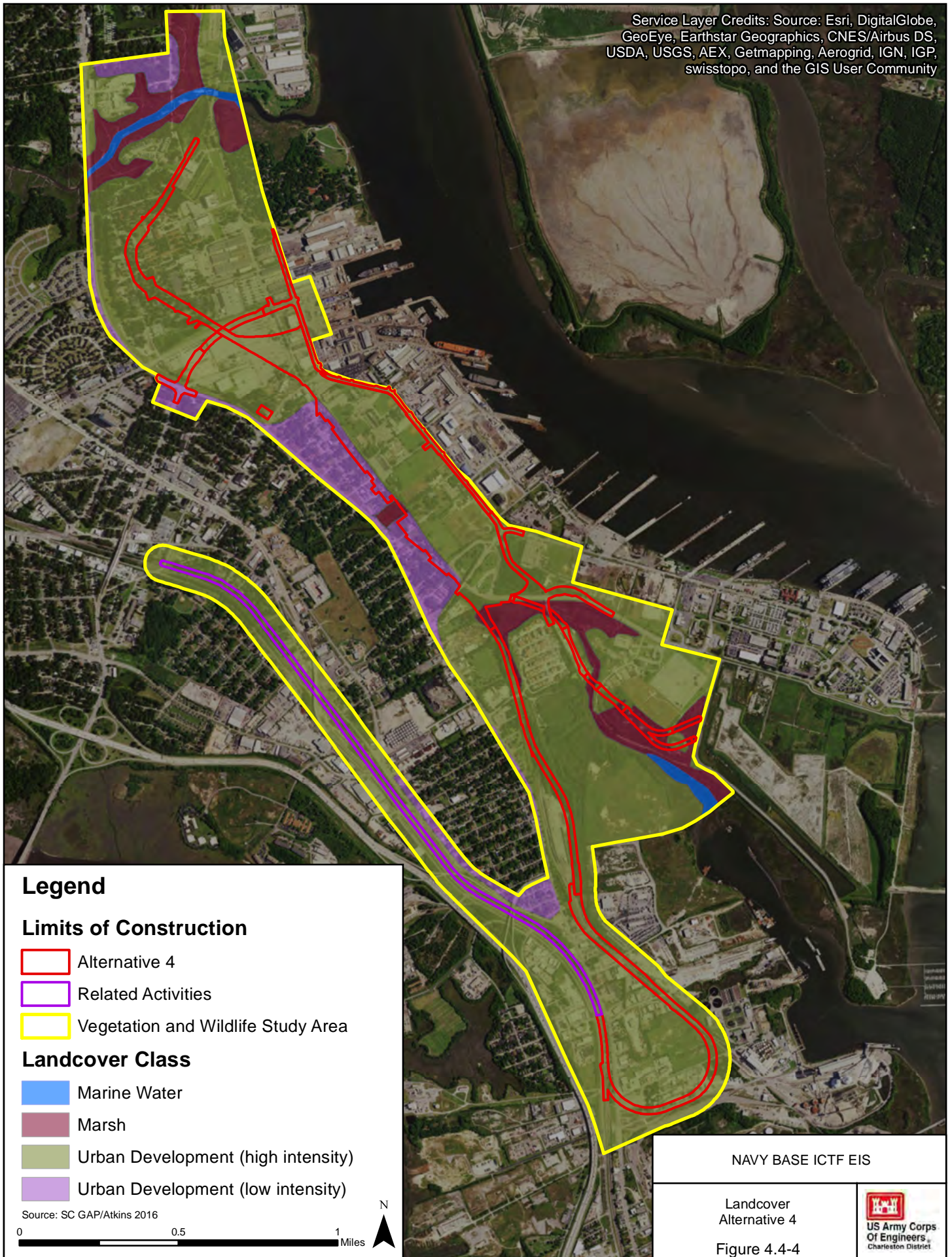
Habitat alteration, habitat fragmentation, introduction of invasive/noxious species, species displacement, and species mortality impacts to vegetation and wildlife under Alternative 4 are expected to be minor which is similar to those discussed under Alternative 1 (Proposed Project); however, there would be no impacts to open marine water habitat and fewer fill and shading impacts to the aquatic species and habitat of Noisette Creek. Construction of Alternative 4 would permanently disturb approximately 215.00 acres of vegetation within the limits of construction of the study area. As shown in Figure 4.4-4, Alternative 4 would permanently alter approximately 205.64 acres of upland terrestrial habitat and 9.35 acres of tidal aquatic habitat (Table 4.4-5).

Table 4.4-5  
Land Cover Impacts for Alternative 4

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Cosgrove/McMillan Overpass	Shading	–	–	2.56	2.56	1.19
Cosgrove/McMillan/Hobson Realignment	Fill	–	–	14.97	14.97	6.96
Drayage Road	Fill	1.27	–	2.68	3.95	1.84
Drayage Road Bridges	Shading	4.77	–	1.64	6.40	2.98
Hobson/Bainbridge Realignment	Fill	0.78	–	9.17	9.95	4.63
ICTF	Fill	1.63	–	129.26	130.89	60.88
Northern Track Lead	Fill	–	–	14.17	14.17	6.59
Southern Connection	Fill	0.90	–	30.50	31.40	14.61
Substation	Fill	–	–	0.70	0.70	0.33
<b>Total*</b>		<b>9.35</b>	<b>0.00</b>	<b>205.64</b>	<b>215.00</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.







#### 4.4.7 Alternative 5: River Center Site (CSX – South via Milford / NS – North via Hospital District)

Alternative 5 is a variation of Alternative 1 (Proposed Project) with the project site being moved to the River Center project site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. The Northern Rail Connection is truncated by the River Center project site, but the location and specifications for the rail bridge crossing Noisette Creek at Noisette Boulevard are the same as those under Alternative 1 (Proposed Project). The Cosgrove Road/McMillan Avenue Overpass would also be slightly different from Alternative 1 (Proposed Project) at the eastern periphery of the ICTF site.

Like Alternative 1 (Proposed Project), most of the road and rail improvements under Alternative 5 would be made to upland habitat to avoid and minimize impacts to aquatic habitat, where feasible. Access bridges would result in the direct loss of aquatic habitat due to pile driving activities and shading impacts. All other impacts are to disturbed/maintained upland habitat.

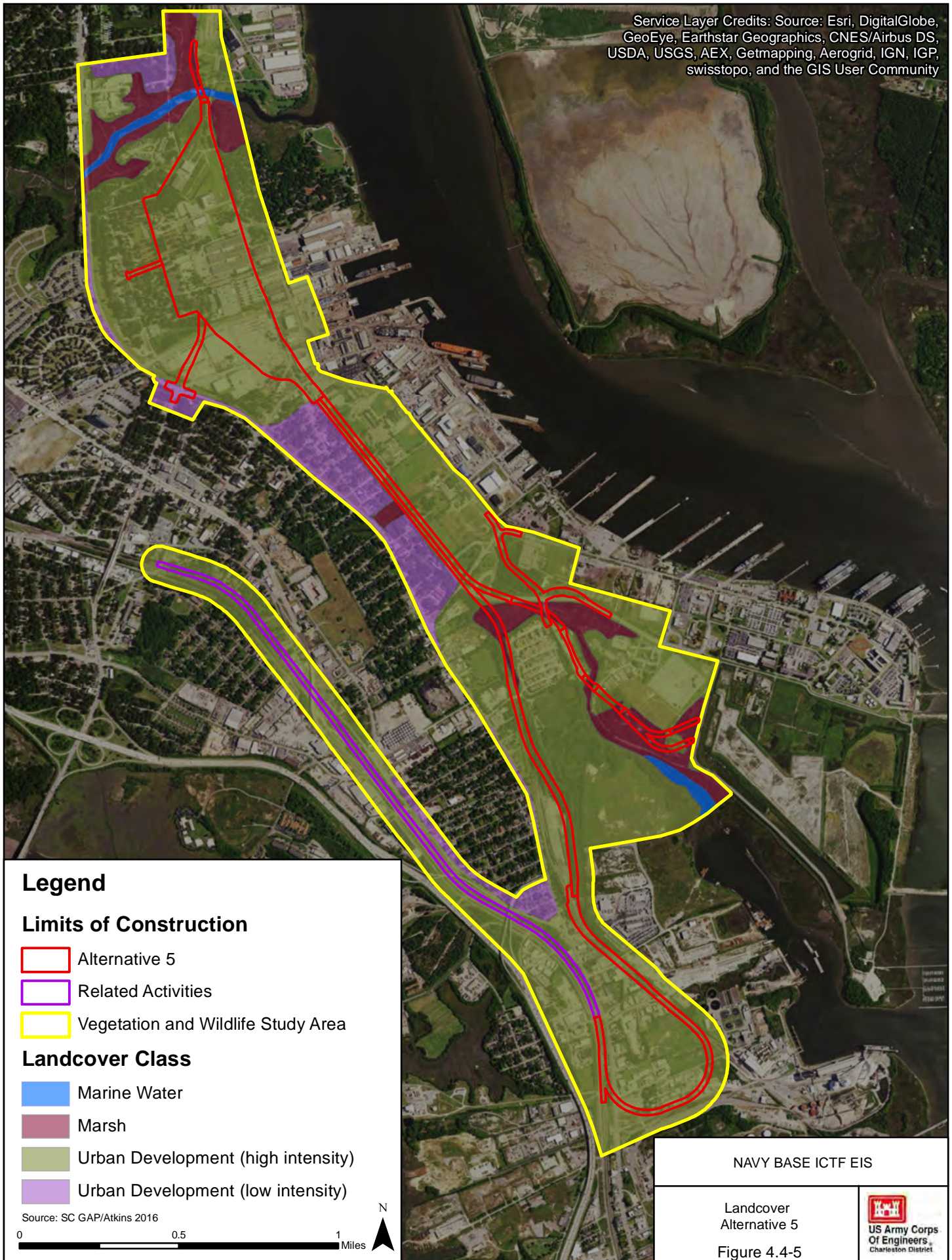
Habitat alteration, habitat fragmentation, introduction of invasive/noxious species, species displacement, and species mortality impacts to vegetation and wildlife under Alternative 5 are expected to be minor which is similar to those discussed under Alternative 1 (Proposed Project); however, under Alternative 5, there would be fewer impacts to upland habitat, because the River Center project site would be smaller than Alternative 1 (Proposed Project). Construction of Alternative 5 would permanently disturb approximately 187.91 acres of vegetation within the limits of construction of the study area. As shown in Figure 4.4-5, Alternative 5 would permanently alter approximately 176.89 acres of upland terrestrial habitat and 11.02 acres of tidal aquatic habitat (Table 4.4-6).

Table 4.4-6  
Land Cover Impacts for Alternative 5

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Drayage Road	Fill	4.53	–	12.53	17.07	9.08
Drayage Road Bridges	Shading	1.51	–	0.87	2.39	1.27
Hobson/Bainbridge Realignment	Fill	0.61	–	7.50	8.11	4.32
ICTF	Fill	–	–	113.12	113.12	60.20
ICTF Access Roads	Fill	–	–	5.94	5.94	3.16
Noisette Bridge	Shading	–	0.25	0.08	0.33	0.17
Northern Connection	Fill	1.32	0.02	0.64	1.97	1.05
Southern Connection	Fill	2.77	–	36.20	38.97	20.74
<b>Total*</b>		<b>10.75</b>	<b>0.27</b>	<b>176.89</b>	<b>187.91</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



## Legend

### Limits of Construction

- Alternative 5
- Related Activities
- Vegetation and Wildlife Study Area

### Landcover Class

- Marine Water
- Marsh
- Urban Development (high intensity)
- Urban Development (low intensity)

Source: SC GAP/Atkins 2016

0 0.5 1 Miles



NAVY BASE ICTF EIS

Landcover  
Alternative 5  
Figure 4.4-5





#### 4.4.8 Alternative 6: River Center Site (CSX – South via Kingsworth / NS – North via Hospital District)

Alternative 6 is a variation of Alternative 1 (Proposed Project) with the project site being moved to the River Center project site. Under Alternative 6, the Southern Rail Connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW), as described in Alternative 3. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. Under Alternative 6, the Northern Rail Connection, Cosgrove Road/McMillan Avenue Overpass, and River Center project site are the same as those described under Alternative 5. The Hobson Road/Bainbridge Avenue realignment, Viaduct Road removal, and drayage road construction are the same as described under Alternative 1 (Proposed Project).

Habitat alteration, habitat fragmentation, introduction of invasive/noxious species, species displacement, and species mortality impacts to vegetation and wildlife under Alternative 6 are expected to be minor, which is similar to those discussed under Alternative 1 (Proposed Project); however, similar to Alternative 5, there would be fewer impacts to upland habitat, because the River Center project site would be smaller than the project site footprint. Construction of Alternative 6 would permanently disturb approximately 171.48 acres of vegetation within the limits of construction of the study area. As shown in Figure 4.4-6, Alternative 6 would permanently alter approximately 160.47 acres of upland terrestrial habitat and 11.02 acres of tidal aquatic habitat (Table 4.4-7).

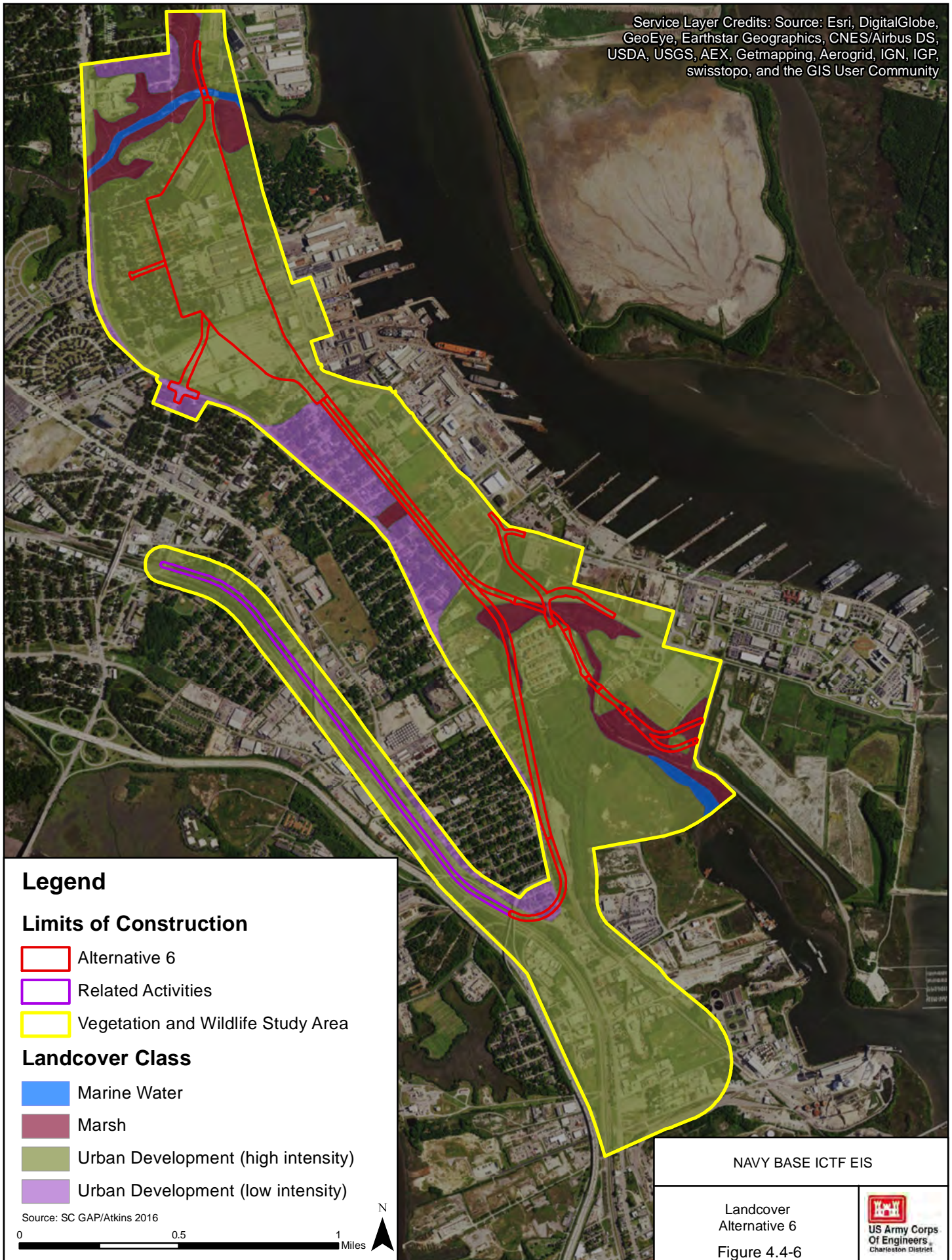
Table 4.4-7  
Land Cover Impacts for Alternative 6

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Drayage Road	Fill	1.27	–	11.76	13.03	7.60
Drayage Road Bridges	Shading	4.78	–	1.65	6.43	3.75
Hobson/Bainbridge Realignment	Fill	0.61	–	7.50	8.11	4.73
ICTF	Fill	–	–	113.12	113.12	65.97
ICTF Access Roads	Fill	–	–	5.96	5.96	3.47
Noisette Bridge	Shading	–	0.25	0.08	0.33	0.19
Northern Connection	Fill	1.32	0.02	0.64	1.98	1.15
Southern Connection	Fill	2.77	–	19.76	22.53	13.14
<b>Total*</b>		<b>10.75</b>	<b>0.27</b>	<b>160.47</b>	<b>171.48</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



## Legend

### Limits of Construction

- Alternative 6
- Related Activities
- Vegetation and Wildlife Study Area

### Landcover Class

- Marine Water
- Marsh
- Urban Development (high intensity)
- Urban Development (low intensity)

Source: SC GAP/Atkins 2016

0 0.5 1 Miles

N

NAVY BASE ICTF EIS

Landcover  
Alternative 6  
Figure 4.4-6



#### 4.4.9 Alternative 7: River Center Site (CSX & NS – South via Milford)

Alternative 7 is a variation of Alternative 1 (Proposed Project) with the project site being moved to the River Center project site. Under Alternative 7, NS, like CSX, would also enter and exit the Navy Base ICTF from a Southern Rail Connection as described under Alternative 4. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. Under Alternative 7, the Cosgrove Road/McMillan Avenue Overpass and River Center project site are the same as those described under Alternative 5. The Hobson Road/Bainbridge Avenue realignment, Viaduct Road removal, and drayage road construction are the same as Alternative 1 (Proposed Project).

Habitat alteration, habitat fragmentation, introduction of invasive/noxious species, species displacement, and species mortality impacts to vegetation and wildlife under Alternative 7 are expected to be minor which is similar to those discussed under Alternative 1 (Proposed Project); however, under Alternative 7, there would be no impacts to marine habitat and fewer fill and shading impacts to the aquatic species and habitat of Noisette Creek. There would also be fewer impacts to upland habitat, because the River Center project site footprint would be smaller than the project site footprint. Construction of Alternative 7 would permanently disturb approximately 189.07 acres of vegetation within the limits of construction of the study area. As shown in Figure 4.4-7, Alternative 7 would permanently alter approximately 179.63 acres of upland terrestrial habitat and 9.43 acres of tidal aquatic habitat (Table 4.4-8).

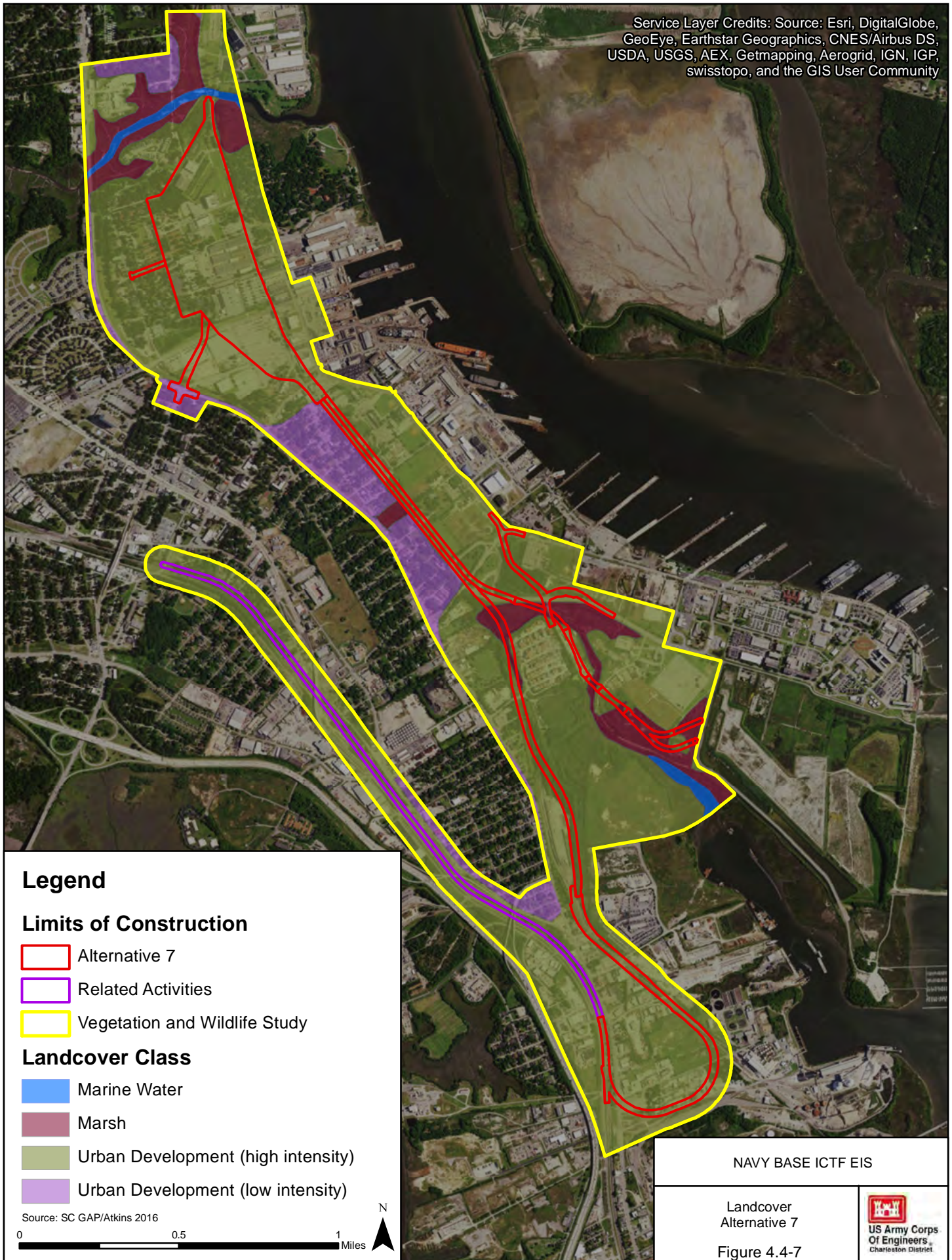
Table 4.4-8  
Land Cover Impacts for Alternative 7

Impact Location	Impacts on Land Cover (acres)					
	Impact Type	Marsh	Marine Water	Urban Development	Total	% of Total
Drayage Road	Fill	1.27	–	11.76	13.03	6.89
Drayage Road Bridges	Shading	4.78	–	1.65	6.43	3.40
Hobson/Bainbridge Realignment	Fill	0.61	–	7.50	8.11	4.29
ICTF	Fill	–	–	113.33	113.33	59.94
ICTF Access Roads	Fill	–	–	5.94	5.94	3.14
Southern Connection	Fill	2.77	–	39.46	42.23	22.34
<b>Total*</b>		<b>9.43</b>	<b>0.00</b>	<b>179.63</b>	<b>189.07</b>	<b>100.00</b>

\*The sum of individual items may not equal totals due to rounding.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



## Legend

### Limits of Construction

- Alternative 7
- Related Activities
- Vegetation and Wildlife Study

### Landcover Class

- Marine Water
- Marsh
- Urban Development (high intensity)
- Urban Development (low intensity)

Source: SC GAP/Atkins 2016



NAVY BASE ICTF EIS

Landcover  
Alternative 7  
Figure 4.4-7





#### 4.4.10 Related Activities

If Alternative 1 (Proposed Project) was constructed, a section of unimproved CSX ROW would have to be activated with rail lines that would accept intermodal trains at the proposed new at-grade crossing at Meeting Street in the vicinity of Discher Street and would terminate in the vicinity of Accabee Road. This Related Activity would apply to Alternatives 1, 2, 4, 5, and 7. Under Alternatives 3 and 6, the Related Activity construction would begin at the proposed new at-grade crossing at Meeting Street in the vicinity of Kingsworth Avenue and would terminate in the vicinity of Accabee Road. Under Alternative 2, an additional Related Activity would be required to connect the NS arrival/departure track from the project site, crossing a portion of marsh that drains to Noisette Creek, to the existing NCTC track along Virginia Avenue.

The impacts on vegetation associated with construction of the Related Activity for each alternative including Alternative 1 (Proposed Project) are summarized in Table 4.4-9. As described above, construction of the Related Activity associated with Alternative 2 would involve impacts to marsh habitat, otherwise most of the impacts from construction of the Related Activity would be to upland, disturbed habitat.

Table 4.4-9  
Land Cover Impacts from Related Activities

Alternative	Impacts on Land Cover (acres)				
	Impact Type	Marsh	Marine Water	Urban Development	Total
Proposed Project	Fill	–	–	22.26	<b>22.26</b>
Alternative 2	Fill	2.14	–	25.77	<b>27.91</b>
Alternative 3	Fill	–	–	16.83	<b>16.83</b>
Alternative 4	Fill	–	–	21.60	<b>21.60</b>
Alternative 5	Fill	–	–	21.60	<b>21.60</b>
Alternative 6	Fill	–	–	16.83	<b>16.83</b>
Alternative 7	Fill	–	–	21.60	<b>21.60</b>

#### 4.4.11 Summary of Impacts Table

Table 4.4-10 summarizes the environmental consequences to Vegetation and Wildlife from the No-Action Alternative, the Proposed Project (Alternatives 1 through 4), and the River Center Site (Alternatives 5 through 7) without the Related Activities.

Table 4.4-10  
Summary of Impacts, Vegetation and Wildlife

Alternative	Habitat	Introduction of Invasive/Noxious Species	Species Displacement	Species Mortality
<b>No-Action</b>	Negligible effect on vegetative land cover classes from habitat alteration and fragmentation due to the continuation of mixed use and industrial land uses.	Minor adverse. Routine maintenance (cutting and mowing) of vegetation could result in the proliferation of invasive/noxious plants present within the study area	Negligible. Existing and future land uses are not expected to directly or indirectly displace the wildlife species inhabiting the study area	Negligible. Existing and future land uses are not expected to result in the mortality of species inhabiting the study area
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Minor adverse. Loss of habitat from removal of vegetation during construction but would not degrade the stability of animal populations; approximately 213.51 acres of vegetation would be removed, of which 95.0 percent would consist of previously disturbed communities and 5.0 percent of natural communities (10.31 acres of marsh and 0.29 acre of marine open water); increase in habitat fragmentation	Minor adverse. Routine maintenance (cutting and mowing) of vegetation could result in the proliferation of invasive/noxious plants present within the study area	Minor adverse. Potential exists for direct and indirect species displacement during construction; common species are relatively abundant and adapted to living in close association with human activity and infrastructure	Minor adverse. Potential exists for mortality of species during construction; wildlife would likely move away in the presence of human activity
<b>2: CSX – Milford / NS – S-line</b>	Same as Alternative 1 (Proposed Project) but approximately 217.49 acres of vegetation would be removed, of which 94.2 percent would consist of previously disturbed communities and 5.8 percent of natural communities (12.21 acres of marsh and 0.36 acre of marine open water)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>3: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 1 (Proposed Project) but approximately 200.87 acres of vegetation would be removed, of which 94.6 percent would consist of previously disturbed communities and 5.4 percent of natural communities (10.54 acres of marsh and 0.29 acre of marine open water)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)

Alternative	Habitat	Introduction of Invasive/Noxious Species	Species Displacement	Species Mortality
<b>4: CSX &amp; NS – Milford</b>	Same as Alternative 1 (Proposed Project) but approximately 214.97 acres of vegetation would be removed, of which 95.7 percent would consist of previously disturbed communities and 4.3 percent of natural communities (9.35 acres of marsh); no marine open water would be impacted	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>5: River Center Site: CSX – Milford / NS – North via Hospital District</b>	Minor adverse loss of habitat from removal of vegetation during construction but would not degrade the stability of animal populations; approximately 187.91 acres of vegetation would be removed, of which 94.1 percent would consist of previously disturbed communities and 5.9 percent of natural communities (10.75 acres of marsh and 0.27 acre of marine open water); increase in habitat fragmentation	Minor adverse. Routine maintenance (cutting and mowing) of vegetation could result in the proliferation of invasive/noxious plants present within the study area	Minor adverse. Potential exists for direct and indirect species displacement during construction; common species are relatively abundant and adapted to living in close association with human activity and infrastructure	Minor adverse. Potential exists for mortality of species during construction; wildlife would likely move away in the presence of human activity
<b>6: River Center Site: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 5 but approximately 171.48 acres of vegetation would be removed, of which 93.6 percent would consist of previously disturbed communities and 6.4 percent of natural communities (10.74 acres of marsh and 0.27 acre of marine open water)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>7: River Center Site: CSX &amp; NS – Milford</b>	Same as Alternative 5 but approximately 189.07 acres of vegetation would be removed, of which 95.0 percent would consist of previously disturbed communities and 5.0 percent of natural communities (9.43 acres of marsh); no marine open water would be impacted	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)

In summary, the land cover types and wildlife habitat within the study area were divided into three categories: marsh, marine water, and urban development. There are no impacts to marine open water from Alternatives 4 and 7. All alternatives, including Alternative 1 (Proposed Project), would impact over 90 percent of previously disturbed habitat within the limits of proposed construction of the study area. Alternatives 5 through 7 would remove and disturb less vegetation and wildlife habitat than Alternative 1 (Proposed Project) due to the smaller River Center project site footprint.



In summary, Alternative 6 would impact less vegetation and wildlife habitat at approximately 171.48 acres when compared to Alternative 1 (Proposed Project) at 213.51 acres.

#### **4.4.12 Mitigation**

##### **4.4.12.1 Applicant's Proposed Avoidance and Minimization Measures**

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Site the ICTF on previously disturbed (with industrial land uses) that is mostly comprised of uplands, thereby minimizing impacts to undeveloped land in the Cooper River watershed. (Minimization)
- Replace significant and/or grand trees under City of North Charleston tree ordinance and payment to the tree bank account. (Minimization)
- Plant native vegetation and trees on the earthen berm along the western property boundary. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Navy Base ICTF is also provided in Chapter 6, Table 6.1.

##### **4.4.12.2 Additional Potential Mitigation Measures**

The following additional mitigation measures have been recommended by the Corps.

- Any disturbed areas could be sprayed in order to prevent the establishment of invasive, noxious weeds.

## 4.5 WATERS OF THE U.S.

### 4.5.1 Methods and Impact Definitions

In this section, Waters of the U.S., including wetlands, are referred to collectively as Waters of the U.S. Waters of the U.S. were evaluated using GIS to determine comprehensive impact estimates to the location, extent, and character of jurisdictional resources. As described in Section 3.5 and Appendix D, the boundaries of Waters of the U.S. were estimated within the Waters of the U.S. study area. Impacts were then quantified using GIS by overlaying limits of construction that were developed for each alternative (Appendix L) against the predicted resources within the study area. Impacts are reported using linear feet for freshwater creeks (tributaries) and acreages for open waters and wetlands.

Tributaries and wetlands within the study area would be affected in varying amounts by all the potential project alternatives. These impacts would result from placement of fill, installation of pilings, temporary construction, or other methods of degradation (such as shading) to jurisdictional areas. The regulatory threshold for placement of fill in non-tidal Waters of the U.S., tidal Waters of the U.S., and creek beds (permanent or temporary) is based on the maximum impacts allowed under the Corps' Nationwide Permits. If impacts to Waters of the U.S. exceed the impact limits for the available Nationwide Permits, an Individual Permit would be required in order to construct the Proposed Project. Impact definitions for Waters of the U.S. are presented in Table 4.5-1. Any loss of Waters of the U.S. would require compensatory mitigation, which is further discussed in Chapter 6. Temporary impacts are anticipated, but sufficient detail to evaluate these impacts is not available; therefore, all impacts to Waters of the U.S. within the limits of construction for each alternative have been evaluated as permanent impacts.

Table 4.5-1  
Impact Definitions, Waters of the U.S.

Negligible	Minor	Major
No direct or indirect impact to Waters of the U.S.	Permanent loss of Waters of the U.S. (under 0.5 acre of non-tidal Waters of the U.S.; under 0.33 acre of tidal Waters of the U.S.)	Permanent loss of Waters of the U.S. (greater than 0.5 acre of non-tidal Waters of the U.S.; greater than 0.33 acre of tidal Waters of the U.S.)

### 4.5.2 No-Action Alternative

Under the No-Action Alternative, the Corps would not issue a DA permit, and construction and operation of the Navy Base ICTF would not occur. For the purposes of this EIS, it is assumed that the project site and the River Center project site would continue to include mixed use (residential and commercial) and industrial land uses. In light of Palmetto Railways' ownership of the properties, there would be the potential for redevelopment of these areas to include rail-served warehousing

and distribution. Future construction and/or other human activities that may occur within the study area could adversely impact to Waters of the U.S.; however, any permanent or temporary impacts would require a permit from the Corps. Since there would be no single, specific project associated with the No-Action Alternative, it would be speculative to quantify the extent of potential permanent or temporary impacts to Waters of the U.S. Therefore, potential future adverse impacts cannot be classified as either minor or major.

#### **4.5.3      Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)**

Under Alternative 1 (Proposed Project), approximately 12.09 acres of Waters of the U.S. would be directly impacted by placement of fill and/or shading activities (Table 4.5-2). Figure 4.5-1 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 1 (Proposed Project). Avoidance and minimization measures incorporated into project site design to reduce impacts to Waters of the U.S. include bridging tidal salt marsh and reducing side slopes to a 2:1 ratio where practicable. While the construction of the ICTF would be the largest land disturbance associated with Alternative 1 (Proposed Project), the roadway and rail improvements have the largest overall impact to Waters of the U.S. Improvements that would result in direct impacts include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.

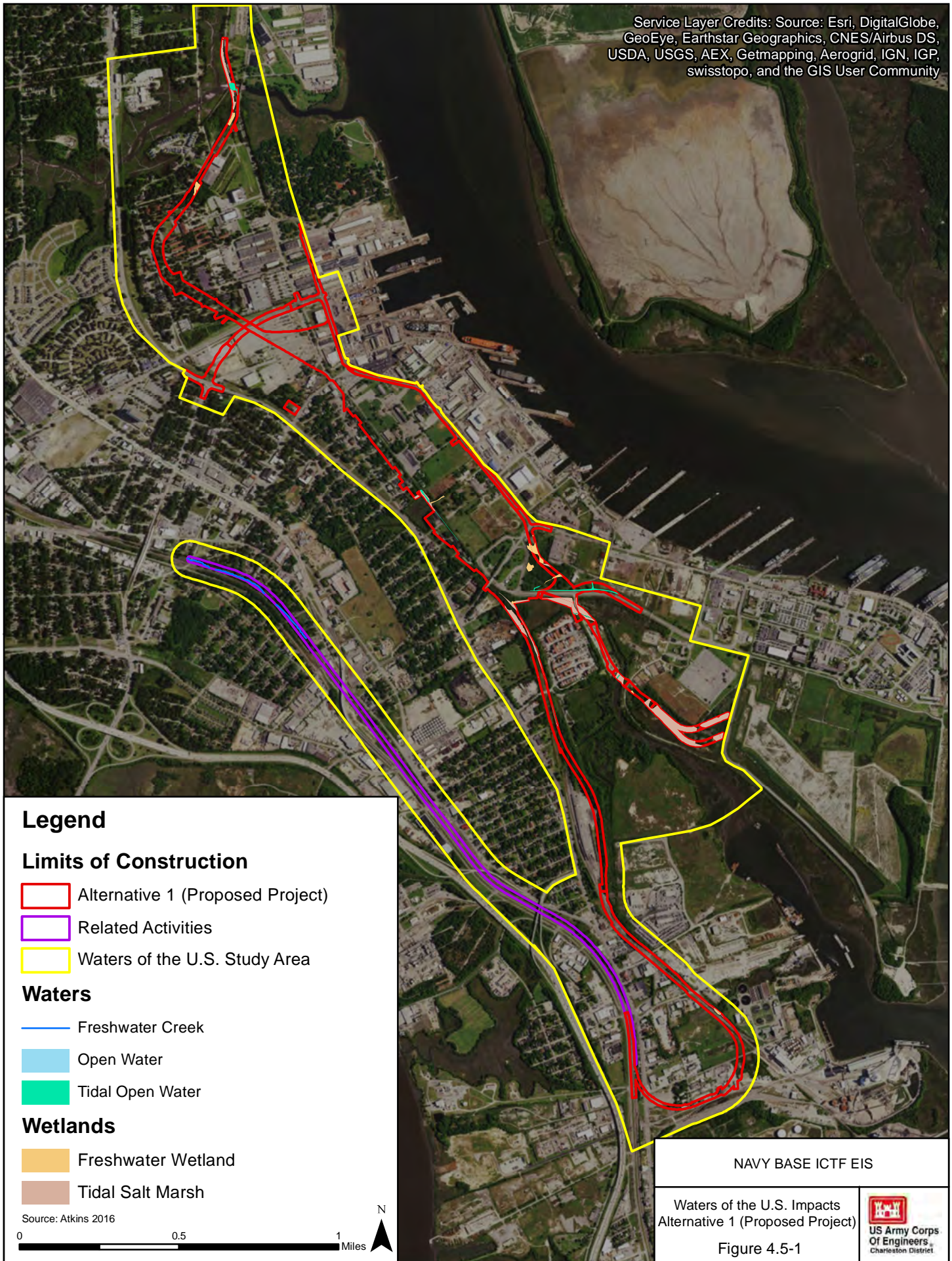
Construction of Alternative 1 (Proposed Project) would impact 8.94 acres of tidal salt marsh followed by 1.77 acres of freshwater wetlands and 1.31 acres of tidal open waters. The majority of impacts to tidal salt marsh are associated with construction of the bridge for the drayage road. The largest impact to freshwater wetlands is associated with construction of the ICTF. Tidal open waters (1.31 acres) would be directly impacted in six locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.07 acre, and occur only at the southern connection.

#### **4.5.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

Impacts to Waters of the U.S. under Alternative 2 would be similar to those under Alternative 1 (Proposed Project), with roadway and rail improvements having the largest overall impact to Waters of the U.S. Construction of Alternative 2 would directly impact approximately 12.92 acres of Waters of the U.S., including 10.24 acres of tidal salt marsh, 1.27 acres of freshwater wetlands, and 1.34 acres of tidal open waters (Table 4.5-3). Figure 4.5-2 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 2. Improvements that would result in direct impacts include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.



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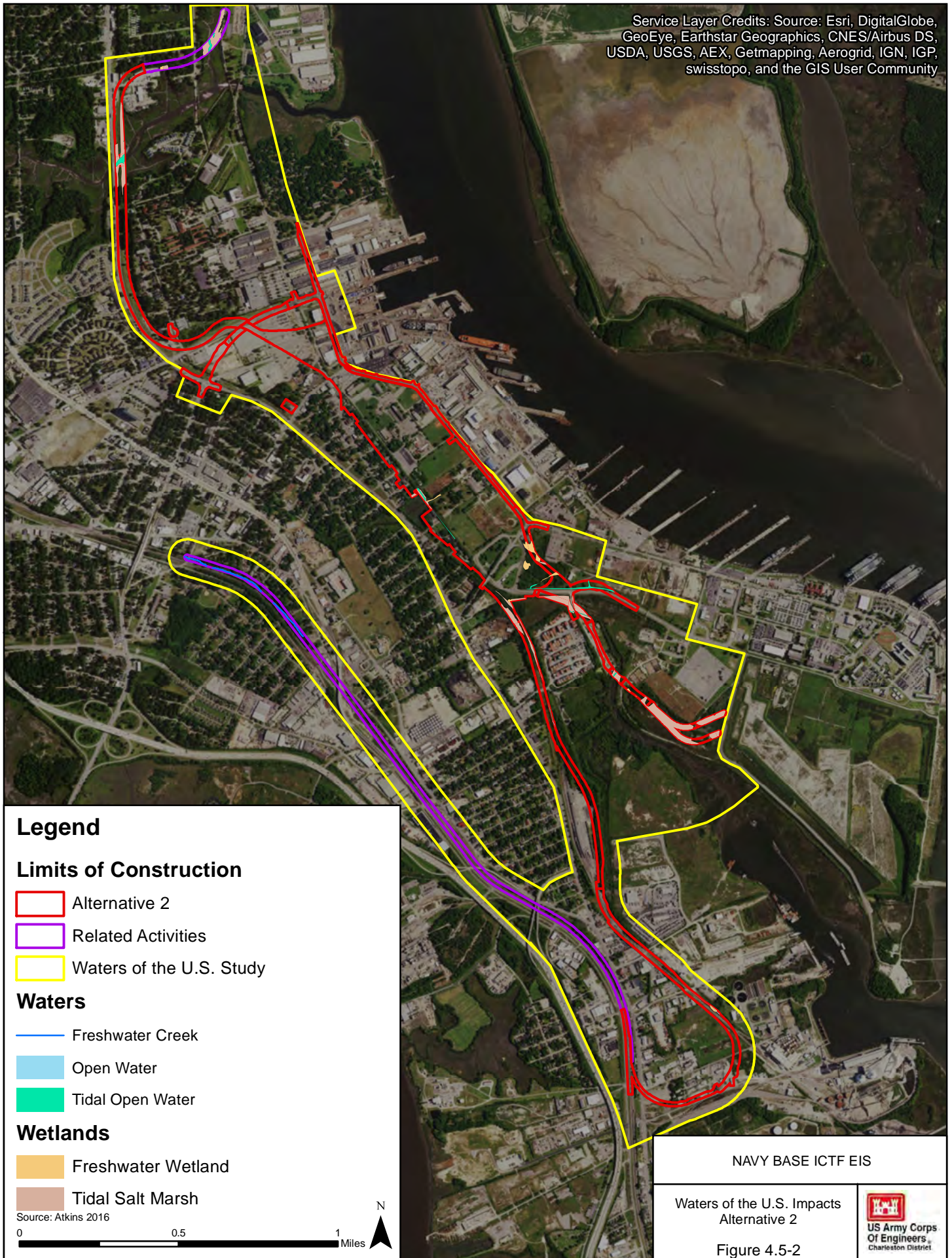


Table 4.5-2  
Waters of the U.S. Impacts for Alternative 1 (Proposed Project)

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Drayage Road	Fill	1.13	—	0.04	—	<b>1.17</b>	<b>9.68</b>
Drayage Road Bridges	Shading	4.66	0.08	—	—	<b>4.74</b>	<b>39.21</b>
Hobson/Bainbridge Realignment	Fill	0.58	0.58	0.54	—	<b>1.70</b>	<b>14.06</b>
ICTF	Fill	1.09	0.30	0.60	—	<b>1.99</b>	<b>16.46</b>
Northern Connection	Fill	0.86	0.04	0.50	—	<b>1.40</b>	<b>11.58</b>
Noisette Bridge	Shading	0.04	0.25	—	—	<b>0.29</b>	<b>2.4</b>
Southern Connection	Fill	0.58	0.06	0.09	0.07	<b>0.80</b>	<b>6.62</b>
<b>Total</b>		<b>8.94</b>	<b>1.31</b>	<b>1.77</b>	<b>0.07</b>	<b>12.09</b>	<b>100.00</b>

Table 4.5-3  
Waters of the U.S. Impacts for Alternative 2

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Cosgrove/McMillan Overpass	Shading	—	—	—	—	<b>0.00</b>	<b>0.00</b>
Cosgrove/McMillan/Hobson Realignment	—	—	—	—	—	<b>0.00</b>	<b>0.00</b>
Drayage Road	Fill	1.13	—	0.04	—	<b>1.17</b>	<b>9.06</b>
Drayage Road Bridges	Shading	4.66	0.08	—	—	<b>4.74</b>	<b>36.69</b>
Hobson/Bainbridge Realignment	Fill	0.58	0.58	0.54	—	<b>1.70</b>	<b>13.16</b>
ICTF	Fill	1.09	0.30	0.60	—	<b>2.45</b>	<b>15.40</b>
Northern Connection	Fill	1.93	0.01	—	—	<b>1.94</b>	<b>15.02</b>
Noisette Bridge	Shading	0.27	0.31	—	—	<b>0.58</b>	<b>4.49</b>
Southern Connection	Fill	0.58	0.06	0.09	0.07	<b>0.80</b>	<b>6.19</b>
St. Johns Cul-de-Sac	—	—	—	—	—	<b>0.00</b>	<b>0.00</b>
Substation	—	—	—	—	—	<b>0.00</b>	<b>0.00</b>
<b>Total</b>		<b>10.24</b>	<b>1.34</b>	<b>1.27</b>	<b>0.07</b>	<b>12.92</b>	<b>100.00</b>



The impacts to tidal salt marsh would occur at seven different locations (Table 4.5-3). The largest impact to freshwater wetlands is associated with construction of the ICTF. Tidal open waters would be directly impacted in six locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.07 acre, and only occur at the Southern Connection.

#### **4.5.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

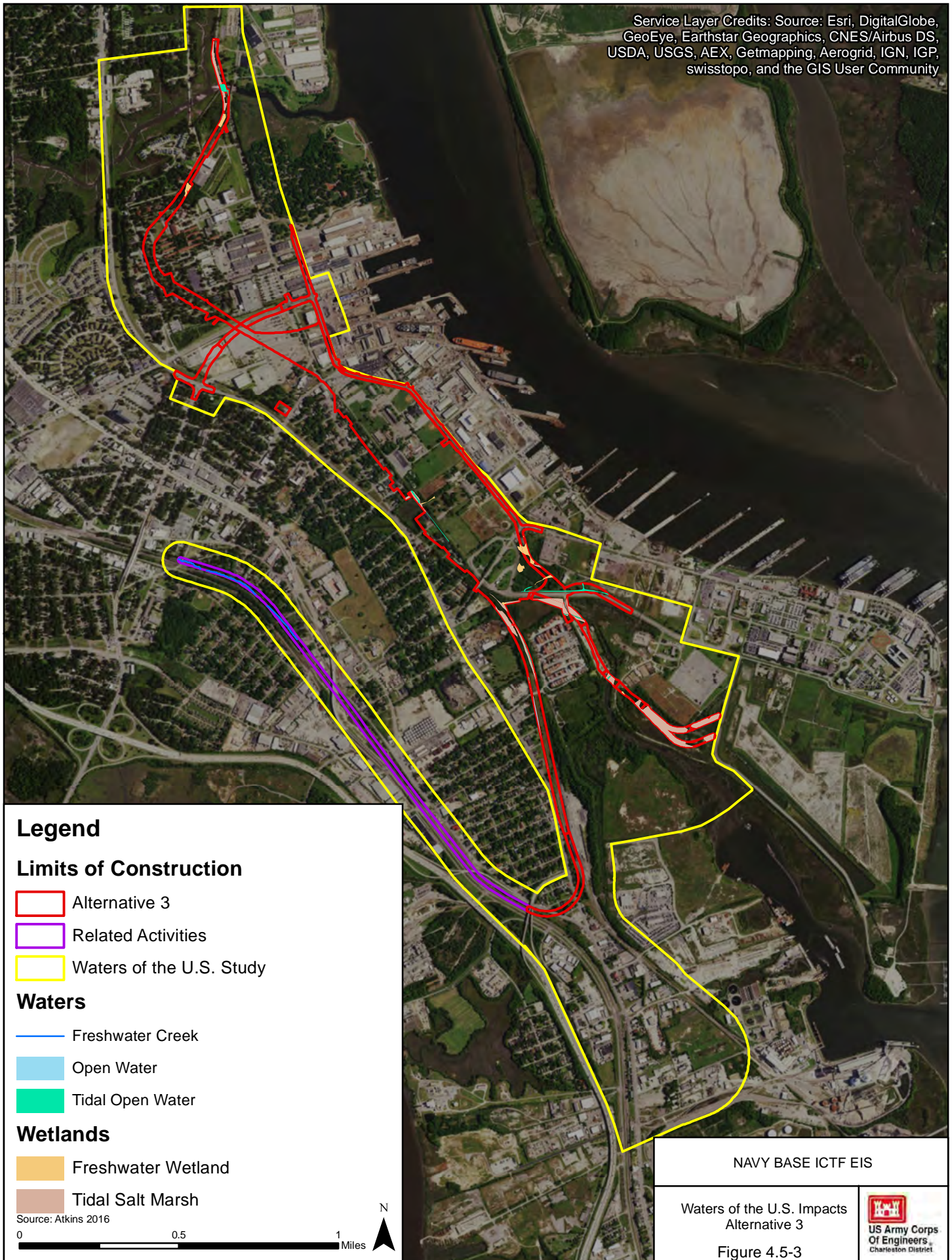
Impacts to Waters of the U.S. under Alternative 3 would be similar to those under Alternative 1 (Proposed Project), with roadway and rail improvements having the largest overall impact to Waters of the U.S. Construction of Alternative 3 would directly impact approximately 12.33 acres of Waters of the U.S., including 9.11 acres of tidal salt marsh, 1.68 acres of freshwater wetlands, and 1.34 acres of tidal open waters (Table 4.5-4). Figure 4.5-3 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 3. Improvements that would result in direct impacts to Waters of the U.S. include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.

The impacts to tidal salt marsh would occur at seven different locations (Table 4.5-4). The largest impact to freshwater wetlands is associated with construction of the ICTF. Tidal open waters would be directly impacted in six locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.20 acre, and only occur at the Southern Connection.

#### **4.5.6      Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

Impacts to Waters of the U.S. under Alternative 4 would be similar to those discussed under Alternative 1 (Proposed Project), with roadway and rail improvements having the largest overall impact to Waters of the U.S. Construction of Alternative 4 would directly impact approximately 10.59 acres of Waters of the U.S., including 8.04 acres of tidal salt marsh, 1.49 acres of freshwater wetlands, and 1.02 acres of tidal open waters (Table 4.5-5). Figure 4.5-4 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 4. Improvements that would result in direct impacts include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.

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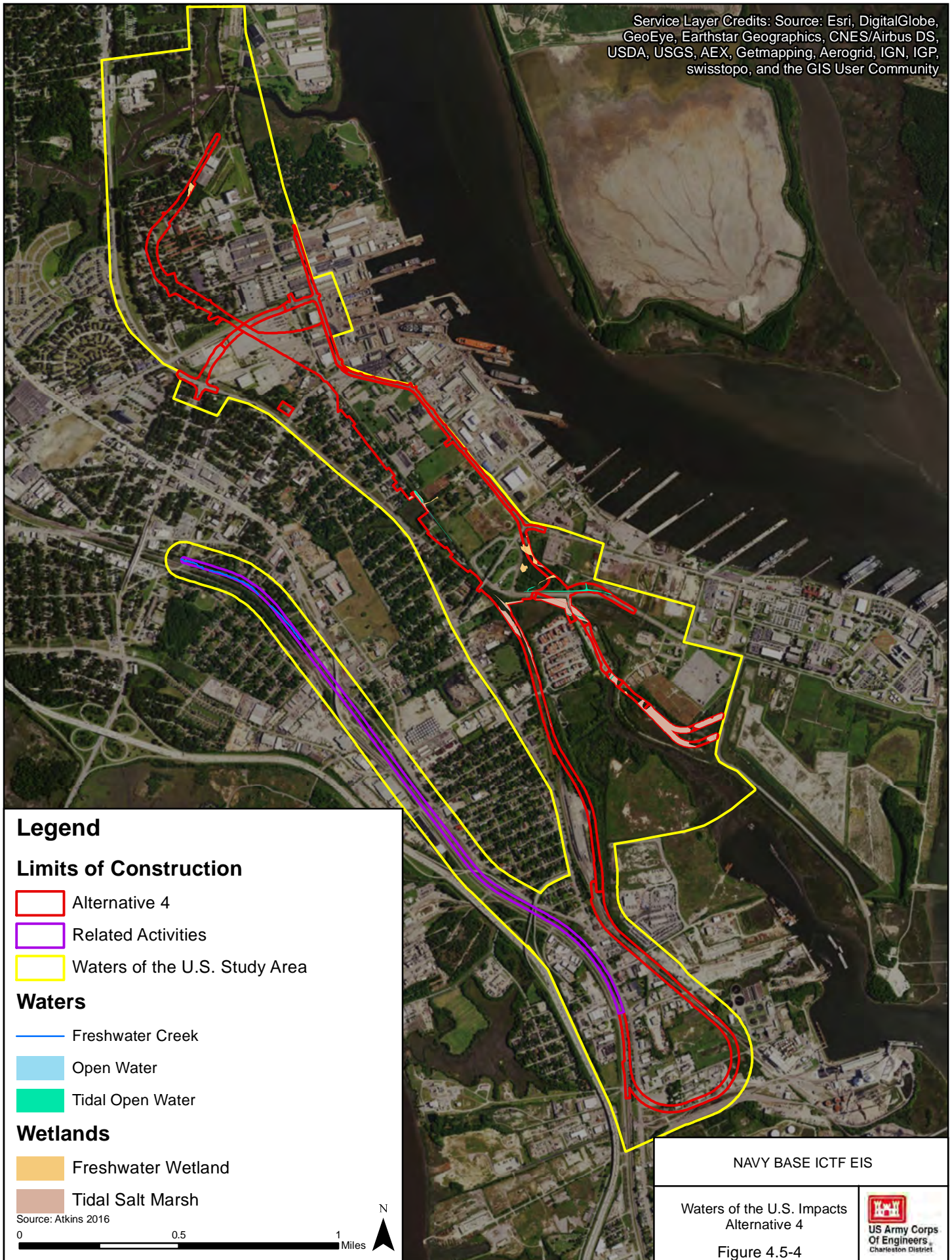




Table 4.5-4  
Waters of the U.S. Impacts for Alternative 3

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Cosgrove/McMillan Overpass	–	–	–	–	–	0.00	0.00
Cosgrove/McMillan/Hobson Realignment	–	–	–	–	–	0.00	0.00
Drayage Road	Fill	1.13	0.08	0.04	–	1.25	10.14
Drayage Road Bridges	Shading	4.66	–	–	–	4.66	37.79
Hobson/Bainbridge Realignment	Fill	0.58	0.58	0.54	–	1.70	13.79
ICTF	Fill	1.09	0.30	0.60	–	1.99	16.14
Northern Connection	Fill	0.86	0.04	0.50	–	1.40	11.35
Noisette Bridge	Shading	0.04	0.25	–	–	0.29	2.35
Southern Connection	Fill	0.75	0.09	–	0.20	1.04	8.43
Substation	–	–	–	–	–	0.00	0.00
<b>Total</b>		<b>9.11</b>	<b>1.34</b>	<b>1.68</b>	<b>0.20</b>	<b>12.33</b>	<b>100.00</b>

Table 4.5-5  
Waters of the U.S. Impacts for Alternative 4

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Cosgrove/McMillan Overpass	–	–	–	–	–	0.00	0.00
Cosgrove/McMillan/Hobson Realignment	–	–	–	–	–	0.00	0.00
Drayage Road	Fill	1.13	–	0.04	–	1.17	11.05
Drayage Road Bridges	Shading	4.66	0.08	–	–	4.74	44.76
Hobson/Bainbridge Realignment	Fill	0.58	0.58	0.54	–	1.70	16.05
ICTF	Fill	1.09	0.30	0.60	–	1.99	18.79
Northern Track Lead	Fill	–	–	0.26	–	0.26	2.46
Southern Connection	Fill	0.58	0.06	0.05	0.04	0.73	6.89
Substation	–	–	–	–	–	0.00	0.00
<b>Total</b>		<b>8.04</b>	<b>1.02</b>	<b>1.49</b>	<b>0.04</b>	<b>11.05</b>	<b>100.00</b>

The impacts to tidal salt marsh would occur at six different locations (Table 4.5-5). The largest impact to freshwater wetlands is associated with construction of the ICTF. Tidal open waters would be directly impacted in four locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.04 acre, and only occur at the Southern Connection.

#### **4.5.7      Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)**

Impacts to Waters of the U.S. under Alternative 5 would be similar to those discussed under Alternative 1 (Proposed Project), with roadway and rail improvements having the largest overall impact to Waters of the U.S. Construction of Alternative 5 would directly impact approximately 12.22 acres of Waters of the U.S., including 9.41 acres of tidal salt marsh, 1.65 acres of freshwater wetlands, and 1.10 acres of tidal open waters (Table 4.5-6). Figure 4.5-5 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 5. Improvements that would result in direct impacts include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.

The impacts to tidal salt marsh would occur at seven different locations (Table 4.5-6). The largest impact to freshwater wetlands is associated with the ICTF. Tidal open waters would be directly impacted in six locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.06 acre, and only occur at the Southern Connection.



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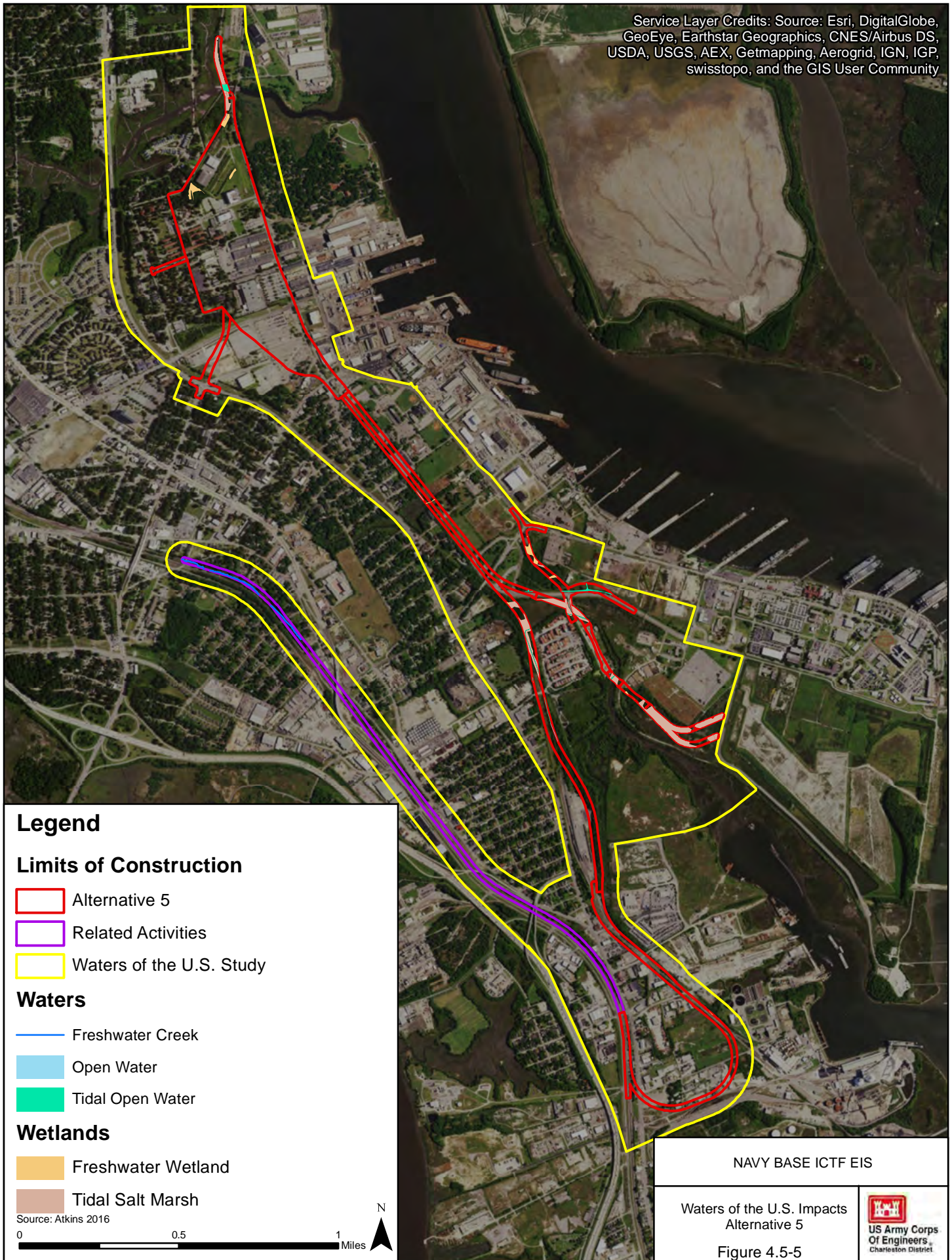




Table 4.5-6  
Waters of the U.S. Impacts for Alternative 5

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Drayage Road	Fill	4.38	0.04	0.06	–	<b>4.48</b>	<b>36.66</b>
Drayage Road Bridges	Shading	1.43	0.08	–	–	<b>1.51</b>	<b>12.36</b>
Hobson/Bainbridge Realignment	Fill	0.41	0.47	0.53	–	<b>1.41</b>	<b>11.54</b>
ICTF	Fill	0.34	–	0.98	–	<b>1.32</b>	<b>10.80</b>
ICTF Access Roads	–	–	–	–	–	<b>0.00</b>	<b>0.00</b>
Noisette Bridge	Shading	0.08	0.24	–	–	<b>0.32</b>	<b>2.62</b>
Northern Connection	Fill	1.07	0.01	–	–	<b>1.08</b>	<b>8.84</b>
Southern Connection	Fill	1.70	0.26	0.08	0.06	<b>2.10</b>	<b>17.18</b>
<b>Total</b>		<b>9.41</b>	<b>1.10</b>	<b>1.65</b>	<b>0.06</b>	<b>12.22</b>	<b>100.00</b>

#### 4.5.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

Impacts to Waters of the U.S. under Alternative 6 would be similar to those discussed under Alternative 1 (Proposed Project), with roadway and rail improvements having the largest overall impact to Waters of the U.S. Construction of Alternative 6 would directly impact approximately 12.26 acres of Waters of the U.S., including 9.41 acres of tidal salt marsh, 1.63 acres of freshwater wetlands, and 1.02 acres of tidal open waters (Table 4.5-7). Figure 4.5-6 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 6. Improvements that would result in direct impacts include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.

The impacts to tidal salt marsh would occur at seven different locations, see Table 4.5-7. The largest impact to freshwater wetlands is associated with construction of the ICTF. Tidal open waters would be directly impacted in six locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.20 acre, and only occur at the Southern Connection.

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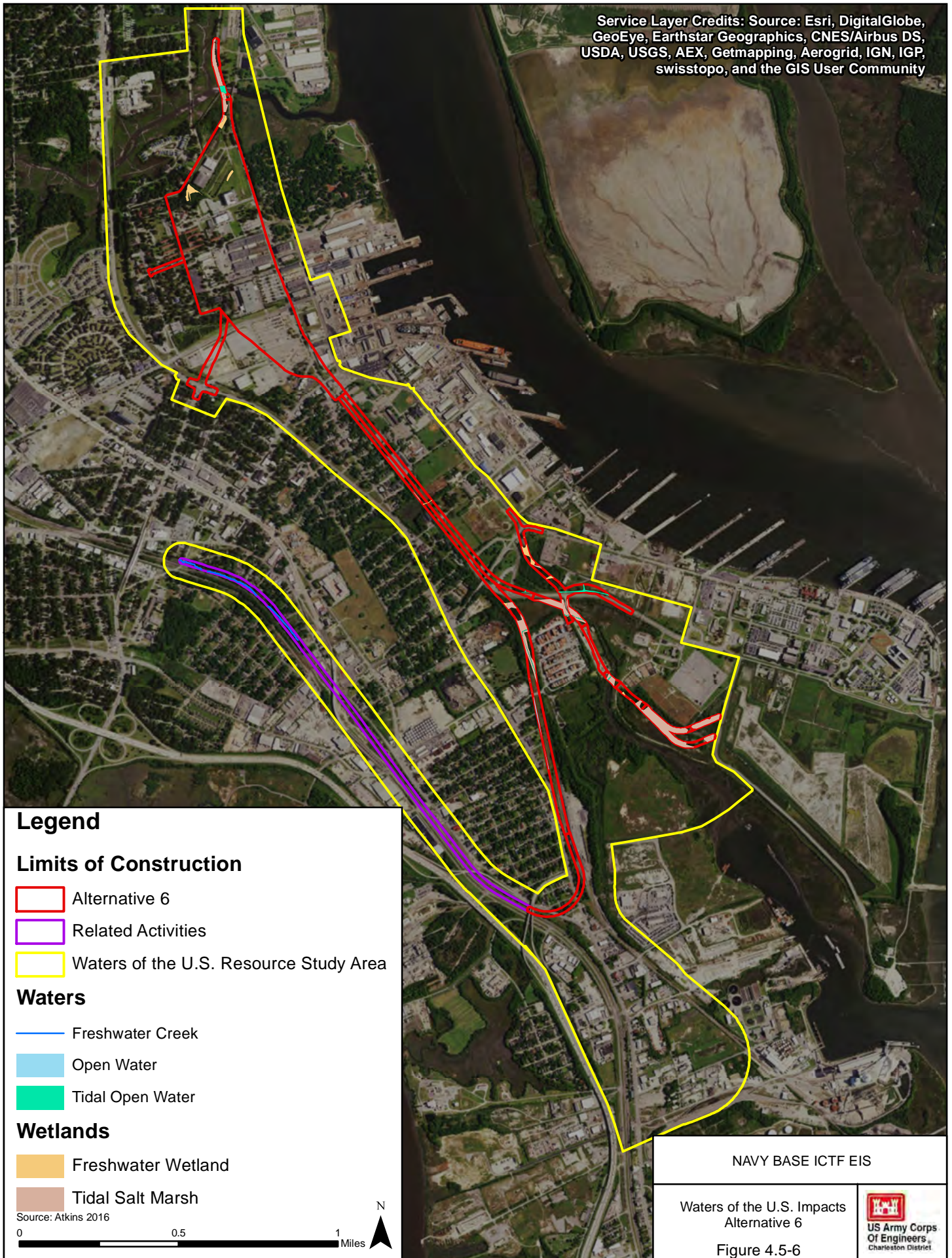




Table 4.5-7  
Waters of the U.S. Impacts for Alternative 6

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Drayage Road	Fill	1.13	0.04	0.06	–	<b>1.23</b>	<b>10.03</b>
Drayage Road Bridges	Shading	4.68	0.08	–	–	<b>4.76</b>	<b>38.83</b>
Hobson/Bainbridge Realignment	Fill	0.41	0.47	0.53	–	<b>1.41</b>	<b>11.50</b>
ICTF	Fill	0.34	–	0.98	–	<b>1.32</b>	<b>10.77</b>
ICTF Access Roads	–	–	–	–	–	<b>0.00</b>	<b>0.00</b>
Noisette Bridge	Shading	0.08	0.24	–	–	<b>0.32</b>	<b>2.61</b>
Northern Connection	Fill	1.07	0.01	–	–	<b>1.08</b>	<b>8.81</b>
Southern Connection	Fill	1.70	0.18	0.06	0.20	<b>2.14</b>	<b>17.46</b>
<b>Total</b>		<b>9.41</b>	<b>1.02</b>	<b>1.63</b>	<b>0.20</b>	<b>12.26</b>	<b>100.00</b>

#### 4.5.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)

Impacts to Waters of the U.S. under Alternative 7 would be similar to those discussed under Alternative 1 (Proposed Project), with roadway and rail improvements having the largest overall impact to Waters of the U.S. Construction of Alternative 7 would directly impact approximately 11.87 acres of Waters of the U.S., including 8.33 acres of tidal salt marsh, 2.60 acres of freshwater wetlands, and 0.86 acre of tidal open waters (Table 4.5-8). Figure 4.5-7 depicts the location of impacts to Waters of the U.S. from implementation of Alternative 7. Improvements that would result in direct impacts include the drayage road, the Hobson/Bainbridge realignment, the ICTF, the Northern Connection, the bridge over Noisette Creek, and the Southern Connection.

The impacts to tidal salt marsh would occur at five different locations (Table 4.5-8). The largest impact to freshwater wetlands is associated with the Southern Connection. Tidal open waters would be directly impacted in five locations, with the largest impact occurring to tidally influenced ditches near the Hobson/Bainbridge Road re-alignment. Direct permanent impacts to Other Open Water (e.g., freshwater ditches) would total 0.08 acre, and only occur at the Southern Connection.



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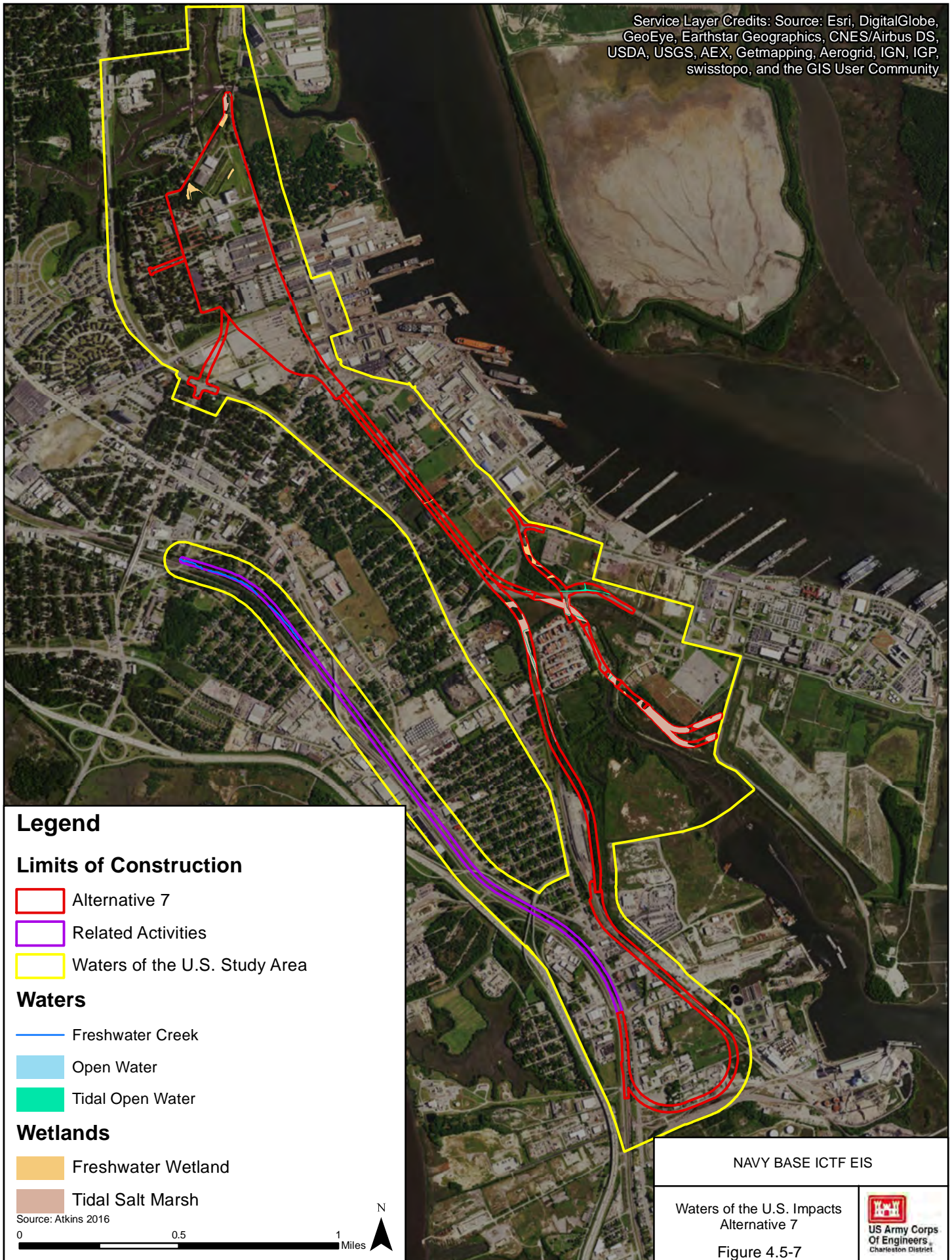


Table 4.5-8  
Waters of the U.S. Impacts for Alternative 7

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Drayage Road	Fill	1.13	0.04	0.06	–	<b>1.23</b>	<b>10.36</b>
Drayage Road Bridges	Shading	4.68	0.08	–	–	<b>4.76</b>	<b>40.10</b>
Hobson/Bainbridge Realignment	Fill	0.41	0.47	0.53	–	<b>1.41</b>	<b>11.88</b>
ICTF	Fill	0.41	0.01	0.98	–	<b>1.40</b>	<b>11.79</b>
ICTF Access Roads	–	–	–	–	–	<b>0.00</b>	<b>0.00</b>
Northern Track Lead	Fill	–	–	–	–	<b>0.00</b>	<b>0.00</b>
Southern Connection	Fill	1.70	0.26	1.03	0.08	<b>3.07</b>	<b>25.86</b>
<b>Total</b>		<b>8.33</b>	<b>0.86</b>	<b>2.60</b>	<b>0.08</b>	<b>11.87</b>	<b>100.00</b>

#### 4.5.10 Related Activities

The Related Activities include two components, the Southern Rail Connection to existing CSX, which occurs for all alternatives, but has unique alignments for Alternatives 3 and 6, and the Northern Rail Connection to Norfolk Southern, which is only proposed for Alternative 2. For all seven alternatives, Related Activities associated with the Southern Rail Connection would result in fill impacts to 2,189.33 linear feet of freshwater creeks. Related Activities of the Northern Rail Connection to Norfolk Southern associated with Alternative 2 would require an additional 1.87 acres of impacts to Waters of the U.S. (Table 4.5-9).

Impacts to Waters of the U.S. associated with Related Activities for all of the alternatives would require a separate 404/401 permit, since ownership of the rail track for these related activities is different than the components of the Proposed Project. Cumulative impacts to Waters of the U.S. would be greater for Alternative 2 due to the crossing of Noisette Creek to tie into the NS tracks as part of the Related Activity.



Table 4.5-9. Summary of Impacts on Waters of the U.S. Impacts for Related Activities

Impact Location	Impacts on Waters of the U.S.						
	Impact Type	Tidal Salt Marsh	Tidal Open Waters	Freshwater Wetlands	Open Water	Total	% of Total
Alternative 2 Related Activity (Northern Connection)	Fill	1.60	0.20	0.07	--	1.87	--

#### 4.5.11 Summary of Impacts Table

Table 4.5-10 summarizes the environmental consequences to Waters of the U.S. from the No-Action Alternative, the Proposed Project (Alternatives 1 through 4), and the River Center Site (Alternatives 5 through 7).

Table 4.5-10  
Summary of Impacts, Waters of the United States

Alternative	Filling of Waters of the U.S.
<b>No-Action</b>	Future construction and/or other human activities could adversely impact Waters of the U.S. within the Waters of the U.S. study area; any permanent or temporary impacts would require a permit from the Corps.
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Major adverse. Direct impacts from fill activities during construction would result in the permanent loss of approximately 12.09 acres of Waters of the U.S., including 8.94 acres of tidal salt marsh, 1.77 acres of freshwater wetlands, and 1.31 acres of tidal open waters. Non-tidal open-water impacts total 0.07 acre.
<b>2: CSX – Milford / NS – S-line</b>	Major adverse. Similar to Alternative 1 (Proposed Project) but would result in the permanent loss of approximately 12.92 acres of Waters of the U.S., including 10.24 acres of tidal salt marsh, 1.27 acres of freshwater wetlands, and 1.34 acres of tidal open waters. Non-tidal open-water impacts total 0.07 acre.
<b>3: CSX – Kingsworth / NS – Hospital</b>	Major adverse. Similar to Alternative 1 (Proposed Project) but would result in the permanent loss of approximately 12.33 acres of Waters of the U.S., including 9.11 acres of tidal salt marsh, 1.68 acres of freshwater wetlands, and 1.34 acres of tidal open waters. Non-tidal open-water impacts total 0.20 acre.
<b>4: CSX &amp; NS – Milford</b>	Major adverse. Similar to Alternative 1 (Proposed Project) but would result in the permanent loss of approximately 10.59 acres of Waters of the U.S., including 8.04 acres of tidal salt marsh, 1.49 acres of freshwater wetlands, and 1.02 acres of tidal open waters. Non-tidal open-water impacts total 0.04 acre.
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Major adverse. Similar to Alternative 1 (Proposed Project) but would result in the permanent loss of approximately 12.22 acres of Waters of the U.S., including 9.41 acres of tidal salt marsh, 1.65 acres of freshwater wetlands, and 1.10 acres of tidal open waters. Non-tidal open-water impacts total 0.06 acre.



Alternative	Filling of Waters of the U.S.
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Major adverse. Similar to Alternative 1 (Proposed Project) but would result in the permanent loss of approximately 12.26 acres of Waters of the U.S., including 9.41 acres of tidal salt marsh, 1.63 acres of freshwater wetlands, and 1.02 acres of tidal open waters. Non-tidal open-water impacts total 0.20 acre.
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Major adverse. Similar to Alternative 1 (Proposed Project) but would result in the permanent loss of approximately 11.87 acres of Waters of the U.S., including 8.33 acres of tidal salt marsh, 2.60 acres of freshwater wetlands, and 0.86 acre of tidal open waters. There are no non-tidal open-water impacts.

## 4.5.12 Mitigation

### 4.5.12.1 Applicant's Proposed Avoidance and Minimization Measures

Each alternative would require review by the Corps under an Individual Section 404 permit, as well as Section 10 and Section 401 consideration for water quality and impacts to Noisette and Shipyard creeks. The impacts to Waters of the U.S. for the various alternatives only vary by approximately 4 acres. All Waters of the U.S. impacts can be mitigated, which would be a consideration during permit review and evaluation of the compensatory mitigation alternatives consistent with 33 CFR 332.

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Site the ICTF on previously disturbed land (with industrial uses) that is mostly comprised of uplands, thereby minimizing impacts to Waters of the U.S. in the Cooper River watershed. (Minimization)
- Design the Navy Base ICTF and roadway and rail improvements to minimize impacts to Waters of the U.S., such as the drayage road placement that reduces impacts to Waters of the U.S. associated with Shipyard Creek. (Minimization)
- Minimize impacts by placing new rail infrastructure adjacent to existing bridges that cross Noisette Creek. (Minimization)
- Utilize bridge structures instead of embankments to cross Noisette Creek and Shipyard Creek to minimize the amount of fill material to Waters of the U.S. (Minimization)
- Where possible, limit the placement of pilings for bridges within waterways. (Minimization)
- Use 2:1 side slopes in areas that are not bridged to minimize the amount of fill material. (Minimization)

- Bridge Noisette Creek on the upstream side of the existing crossing, where the crossing of marsh habitat is narrower. (Minimization)
- Employ construction methods, such as temporary bridging, top-down construction, timber mats, floating barges, and/or temporary work trestles as often as possible to minimize impacts. (Minimization)
- Design culverts and bridges to maintain existing flow/exchange and hydrology for wetland areas and marshes. (Minimization)
- Design a landscaped earthen berm to provide for sound attenuation along the length of the processing and classification railroad tracks adjacent to the Chicora and Cherokee neighborhoods includes the replacement of an earthen berm with a sound attenuation and security wall in areas adjacent to Waters of the U.S. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Proposed Project is also provided in Chapter 6, Table 6-1.

#### **4.5.12.2 Additional Potential Mitigation Measures**

In addition to the measures proposed by the Applicant, the Corps will consider other potential mitigation measures to reduce the impacts on Waters of the U.S. resulting from the Proposed Project, which will be included in the FEIS and Record of Decision.

## 4.6 PROTECTED SPECIES

### 4.6.1 Methods and Impact Definitions

Impacts to Protected Species, which includes all Federal and state-listed threatened, endangered, at-risk, and candidate species, were evaluated using literature review, GIS, presence/absence, and best professional judgment. The NMFS Pile Driving Calculator Model was used to assess the potential underwater noise impacts to Protected Species from pile driving activities for the Proposed Project (NMFS 2015). This model is based on data from similar piles in similar substrate and requires an estimate of the total number of strikes per day to install the piles. Assumptions for input into the NMFS model were based on the number of strikes proposed for the 20-inch and 24-inch diameter pre-cast concrete piles. Reference noise levels were selected from the Compendium of Pile Driving Sound Data, updated in October 2012, provided as Appendix I to Caltran's Final Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish (February 2009) to represent the Proposed Project (Caltrans 2012).

Impacts to Protected Species would be considered adverse if actions associated with the Proposed Project would result in the taking of a species. Impacts to species habitat and critical habitat would be considered adverse if direct physical alterations to a species habitat impacts their ability to live. (Table 4.6-1).

Table 4.6-1  
Impact Definitions, Protected Species

	<b>Negligible</b>	<b>Minor</b>	<b>Major</b>
<b><i>Species</i></b>	Very small impact to Protected Species	Small impact (in number, quantity, or extent) to Protected Species but not resulting in much trouble or damage	Large impact (in number, quantity, or extent) to Protected Species resulting in serious damage
<b><i>Critical Habitat</i></b>	Very small alteration to critical habitat	Small alteration (in quantity or extent) to critical habitat that does not impair a Protected Species ability to live	Large alteration that appreciably diminishes the value of critical habitat for survival of Protected Species



### 4.6.2 No-Action Alternative

Under the No-Action Alternative, the Corps would not issue a DA permit, and construction and operation of the Navy Base ICTF would not occur. For the purposes of this EIS, it is assumed that the project site and the River Center project site would continue to include mixed use (residential and commercial) and industrial land uses. In light of Palmetto Railways' ownership of the properties, there would be the potential for redevelopment of these areas to include rail-served warehousing and distribution. It is assumed that available habitat for Protected Species in the Protected Species study area (Figure 3.6-1) would be similar to existing conditions. The natural resources throughout the region would likely change as a result of other urban growth and development projects.

Under the No-Action Alternative, there is the potential for impacts to some of the Protected Species and/or their habitat identified in Tables 3.6-2, 3.6-4, 3.6-6, and 3.6-7 from future construction and development activities associated with the project site and River Center project site. Although the extent of potential impacts to Protected Species is unknown, it is assumed that future actions under the No-Action Alternative could have a negligible impact on Protected Species and/or their habitat as a result of future construction activities.

### 4.6.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Construction of the Proposed Project has the potential to affect several Protected Species and/or their habitat, including critical habitat (see Table 4.6-2). Potential temporary and permanent impacts are described in general below and then discussed with respect to certain Protected Species with the potential to occur in the study area.

The majority of impacts to Protected Species anticipated as a result of the Proposed Project would be temporary in nature. Specific activities associated with the Proposed Project that could result in temporary displacement of individuals and/or alterations to habitat include the construction of the drayage road and arrival/departure tracks near tidal salt marsh and Shipyard and Noisette creeks (physical alterations to habitat and fragmentation) and bridge improvements in Shipyard and Noisette creeks (shading, underwater noise, sedimentation).

Table 4.6-2  
Protected Species Impacts for Alternative 1 (Proposed Project)

Species Common Names	Species Scientific Name	Federal Status <sup>1</sup>	State Status <sup>5</sup>	Summary of Impacts with BMPs and Mitigation Measures
<b>Reptiles</b>				
Green sea turtle	<i>Chelonia mydas</i>	Threatened <sup>3</sup>	-	Negligible
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	-	Negligible
Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened, Critical Habitat <sup>4</sup>	Threatened	Negligible
Spotted turtle	<i>Clemmys guttata</i>	ARS <sup>2</sup>	Threatened	Negligible
<b>Marine Mammals</b>				
West Indian manatee	<i>Trichechus manatus</i>	Endangered	-	Negligible
<b>Fish</b>				
American eel	<i>Anguilla rostrata</i>	ARS <sup>2</sup>	-	Negligible
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	Endangered	-	Negligible
Blueback herring	<i>Alosa aestivalis</i>	ARS <sup>2</sup>	-	Negligible
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered	Endangered	Negligible
<b>Insects</b>				
Rare skipper	<i>Problema bulenta</i>	ARS <sup>2</sup>	-	Negligible
<b>Birds</b>				
Bald eagle	<i>Haliaeetus leucocephalus</i>	Protected	Threatened	Negligible
Black Rail	<i>Laterallus jamaicensis</i>	ARS <sup>2</sup>	-	Negligible
Least tern	<i>Sterna antillarum</i>	-	Threatened	Negligible
MacGillivray's seaside sparrow	<i>Ammodramus maritimus macgillivrayi</i>	ARS <sup>2</sup>	-	Negligible
Red knot	<i>Calidris canutus rufa</i>	Threatened	-	Negligible

Species Common Names	Species Scientific Name	Federal Status <sup>1</sup>	State Status <sup>5</sup>	Summary of Impacts with BMPs and Mitigation Measures
Wilson's plover	<i>Charadrius wilsonia</i>	-	Threatened	Negligible
Wood stork	<i>Mycteria americana</i>	Threatened	Endangered	Negligible

<sup>1</sup> *Federally Endangered* refers to a taxon "in danger of extinction throughout all or a significant portion of its range."

*Federally Threatened* refers to a taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

<sup>2</sup> *Federally At-Risk Species (ARS)* refers to species that a) are proposed for listing under the ESA by the USFWS, b) are candidates for listing under the ESA, or c) have been petitioned for listing under the ESA. Information is provided only for conservation actions as no Federal protections currently exist.

<sup>3</sup> Green turtles are listed as threatened, except for breeding populations in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

<sup>4</sup> Critical habitat refers to a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species, and that may require special management and protection (a more complete definition can be found in the ESA of 1973).

<sup>5</sup> *State Endangered* refers to "any species or subspecies of wildlife whose prospects of survival or recruitment within the State are in jeopardy or are likely within the foreseeable future to become so."

*State Threatened* refers to "a species that is likely to become endangered and in need of management."

Under the Proposed Project, construction and/or improvements to the rail bridges and drayage road and arrival/departure tracks could affect the aquatic Protected Species that may inhabit the tidal open waters within the study area. As discussed in Section 3.6, the tidal open (estuarine) waters of the study area provide marginally suitable foraging habitat for the green, loggerhead, leatherback, and Kemp's ridley sea turtles and West Indian manatee; suitable spawning habitat for adult Atlantic sturgeon due to the presence of flow, salinity, and certain substrates, and may contain feeding and foraging habitat for juveniles, sub-adults, and adults; and suitable overwintering habitat for shortnose sturgeon. The study area may contain marginal habitat for the spotted turtle in freshwater wetlands and ditches and nearby terrestrial habitats. Thus, construction activities within or adjacent to Shipyard and Noisette creeks may affect these aquatic Protected Species; however, with implementation of the BMPs and/or mitigation measures discussed in Section 4.6.12 as part of Alternative 1 (Proposed Project), the impacts to these aquatic Protected Species from Proposed Project construction would be negligible.

There is the potential for bald eagles to inhabit or traverse the study area, but the lack of extensive areas of forest needed for nesting and perching near the Cooper River or Shipyard and Noisette creeks minimizes the potential for a major adverse impact to the bald eagle. Additionally, according to the SCDNR database (SCDNR 2014c), there are no documented bald eagle nest sites in the immediate vicinity of the study area. The study area contains suitable habitat for the least tern due to the presence of graveled rooftops; however, nest surveys in 2014 showed no active nests within the study area; thus, the potential for adverse impacts to this species would be minor.

The study area contains the presence of suitable foraging habitat for overwintering or migrating red knots and Wilson's plover due to the presence of mud flats within the tidal salt marsh and tidal open



water vegetation communities. The study area also contains potentially suitable habitat for the black rail and MacGillivray's seaside sparrow due to the presence of salt marshes and shallow freshwater marshes. The tidal salt marsh and tidal open water vegetation communities also provide suitable foraging habitat for the wood stork and rare skipper. If present during construction activities, these bird species would most likely depart the area of potential disturbance, thus resulting in a negligible impact from temporary displacement.

### Underwater Noise

In-water construction activities associated with the Proposed Project would result in underwater noise from pile installation. As discussed in Section 3.6.6, during pile driving, noise is produced when the energy from the hammer is transferred to the pile and released as pressure waves into the surrounding water and sediments. Depending on the type and location of pile-driving activity, pile-driving noise can result in potential effects ranging from behavioral effects (caused by the animal hearing the noise), to physiological effects with very extreme cases resulting in death (NMFS 2014).

Exposure criteria are used to assess whether noise from construction projects may affect a listed species. If an animal is likely to be exposed to noise levels that exceed the injury threshold levels, injury is expected and measures to avoid or minimize the potential for harmful exposure should be required (NMFS 2014). Injurious levels are expressed in units of peak pressure level or SEL. Sound exposure level can be expressed as a single strike or cumulative, sSEL or cSEL, respectively for exposure to pile-driving noise over time. The cumulative exposure is based on the amount of time an animal may be exposed to noise from repeated strikes of impact hammers. For any given set of conditions (source level, type of transmission loss, strikes/pile) over some period of time, cumulative exposure may result in some risk of hearing loss even if the sSEL is below the threshold for injury. Animal hearing is characterized by the RMS dB level and is used as the criteria for the auditory detection and resulting behavioral reactions to a noise (NMFS 2014).

Alternative 1 (Proposed Project) includes the installation of approximately 130 pre-stressed concrete piles for construction of the proposed rail and road bridges. The proposed piles would be 60 feet long and consist of approximately 80, 20-inch diameter, pre-cast concrete piles for the Noisette Creek rail bridge; and approximately 50, 24-inch diameter, pre-cast concrete piles for the Shipyard Creek road bridge. The proposed installation plan estimates driving 10 piles per day in approximately 4.5 feet of water for Noisette Creek and 0 to 1 foot of water for Shipyard Creek. During construction of the Proposed Project, the work day hours are estimated to be approximately 10 hours per day, with the actual pile driving activity to be an average of 8 hours per day. Using one installation rig over a 6-day work week, it would take approximately 8 days to complete the Noisette Creek installation and 5 days to complete the Shipyard Creek installation. The estimated total number of strikes per day would be 4,000 strikes. One area would be completed before pile driving was initiated at the other pile driving site.

Based on the size of the piles and estimated water depths, noise generated by installation of the piles at both Noisette Creek and Shipyard Creek is estimated to be 185 decibels (dB) peak, with a cumulative strike sound exposure level of 191 dB cSEL, and RMS sound levels of 166 dB. Based on a scenario of 4,000 total strikes per day, the model analysis shows that the threshold for physical injury to protected fish species that are larger than 2 grams would have the potential to be exceeded up to 62 feet from the installation sites. The threshold for physical injury to protected fish species that are smaller than 2 grams would have the potential to be exceeded up to 72 feet from the installation sites. Table 4.6-3 provides a summary of the NMFS Pile Driving Calculator Model outputs for this analysis.

Table 4.6-3  
Underwater Noise Analysis of Pile Driving Activities for Alternative 1 (Proposed Project)

Noisette Creek – Analysis Based on 4,000 Total Strikes Per Day									
Pile Type	Source sound at 4.5 feet			Estimated Number of Strikes (total)	SEL, accumulated	Distance (feet) to threshold			
						Onset of Physical Injury		Behavior	
						Peak dB (206)	Cumulative SEL dB*		RMS dB (150)
	peak sound dB	SEL, single strike dB	RMS dB				Fish ≥2 grams (187)	Fish <2 grams (183)	
20-inch-diameter Pre-cast Concrete	185	155	166	4,000	191	0	62	72	117
Shipyard Creek – Analysis Based on 4,000 Total Strikes Per Day									
Pile Type	Source sound at 1 foot			Estimated Number of Strikes (total)	SEL, accumulated	Distance (feet) to threshold			
						Onset of Physical Injury		Behavior	
						Peak dB (206)	Cumulative SEL dB*		RMS dB (150)
	peak sound dB	SEL, single strike dB	RMS dB				Fish ≥2 grams (187)	Fish <2 grams (183)	
24-inch-diameter Pre-cast Concrete	185	155	166	4,000	191	0	62	72	117

\* This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

The underwater noise levels generated during pile driving of unattenuated piles would not exceed the adopted 206 dB peak criteria for injury to fish. The cSEL would minimally exceed the 187 dB criteria without an attenuation system on all piles. Thus, noise from pile driving has the potential to affect shortnose and Atlantic sturgeon in the project area.

Sturgeon are hearing generalists that do not have specialized hearing structures or use sound as part of their behavior, and therefore sturgeon are less sensitive to noise than hearing specialist species of fish. Based on study of lake sturgeon (a reasonable surrogate for shortnose and Atlantic sturgeon), sturgeon have comparatively poor hearing sensitivity (Meyer et al. 2010 and 2011 as cited in Parsons

Brinckerhoff 2015), and it is likely that many of the sounds which are audible to most species are not audible to sturgeon (AKRF et al. 2012 as cited in Parsons Brinckerhoff 2015).

Krebs et al. (2013 as cited in Parsons Brinckerhoff 2015) evaluated pile driving effects on sturgeon for the Tappan Zee Pile Installation Demonstration project and found that sturgeon exhibited avoidance behavior by staying in the project vicinity for a shorter time period during pile driving activities than during silent control periods. In the Biological Opinion (BO) for the Tappan Zee Pile Installation Demonstration project, NMFS deduced that sturgeon would avoid pile driving noise and would not remain in proximity of the proposed construction area long enough to accumulate sufficient sound energy to reach the cumulative criterion. As such, given the avoidance behavior of sturgeon, cumulative exposure to pile-driving noise from that project would not affect sturgeon.

Additionally, as part of Alternative 1 (Proposed Project), the following minimization measures would be implemented to reduce potential impacts on sturgeon to a negligible effect:

- The contractor will use air bubble curtains and/or sleeve piles during pile installation. Depending on the type of bubble curtain (e.g. confined or unconfined air bubble curtains or multiple-stage unconfined air bubble curtains) and considering the velocity of the current/tidal flow, a range of 5 to 20 dB of noise reduction could be achieved (Caltrans, 2012).
- The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25-40% of the pile driver's energy, followed by a one-minute waiting period.

In the BO for the Tappan Zee Pile Installation Demonstration project, NMFS (2012) concurred that soft-start techniques for pile driving activities is expected to cause fish to leave the area prior to full energy pile driving, and that a soft-start method will facilitate avoidance of physical injury. Aside from Noisette and Shipyard creeks, other areas in the Cooper River provide adequate foraging and overwintering habitat that sturgeon can move into during pile driving operations. Therefore, it is not anticipated that sturgeon would be adversely affected by physical injury from peak, sSEL, and cSEL noise levels.

The use of vibratory pile driving is non-impulsive, which is not known to cause injury to marine mammals and may be used along with other underwater noise mitigation measures to reduce noise exposure to marine species. While some underwater noise exposure would be unavoidable, the following minimization measures would be implemented as part of the Proposed Project to reduce potential impacts on manatees to a negligible effect:

- During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place.
- Adherence to USFWS's standard manatee guidelines during construction (listed in Section 4.6.12).



- The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to aquatic Protected Species.

Similar to sturgeon, manatees are expected to avoid the project site during pile driving activities. The semi-permeable turbidity curtain will act as a physical barrier between manatees and the project site. Therefore, it is not anticipated that manatees would be adversely affected by physical injury from in-water construction activities with the implementation of the USFWS manatee guidelines and proposed use of turbidity curtains as part of the Proposed Project.

Like manatees, sea turtles are expected to avoid the project site during pile driving activities. As discussed above for the manatee, during in-water work, should sea turtles be present, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place. The turbidity curtain will act as a physical barrier between sea turtles and the project site. Noise associated with the construction work and location of work will likely deter any animals from remaining in the area extensively. If a Protected Species is observed in the work area, the contractor would issue a stop-work order until the Protected Species had vacated the area.

Additionally, potential impacts resulting from construction activities associated with the Proposed Project could be further minimized by adhering to environmental in-water work windows that are established by the Corps, which restricts construction activities to periods when turtles are least abundant or least likely to be affected by such activities. The environmental work windows for sea turtles typically target the winter months because sea turtle abundance is dramatically reduced during colder water temperatures. Therefore, it is not anticipated that sea turtles are would be adversely affected by in-water construction activities with implementation of the above mentioned avoidance and minimization measures; thus, potential impacts on sea turtles from Alternative 1 (Proposed Project) would be negligible.

### Turbidity/Siltation

Construction and pile driving activities will cause temporary increases in the turbidity and siltation of the water column, but the duration of these activities will be brief and a semi-permeable turbidity curtain will be used to minimize sedimentation around areas where pile driving is taking place. Piles compress the sediment around them when they are driven (Parsons Brinckerhoff 2015). This temporary increase in turbidity would only cause minimal effects to Noisette Creek, Shipyard Creek, and the Cooper River localized at the project site, since tidally influenced water bodies, such as the Cooper River exhibit naturally high turbidity levels. Therefore, turbidity impacts on the aquatic Protected Species should be minimal and would be limited to the immediate area of the construction.

During construction activities temporary siltation may occur in Noisette Creek, Shipyard Creek, and the Cooper River. Temporary siltation may cause indirect impacts by effecting thermal loading in the environment. Alterations in light attenuation in the water column can cause decreased visibility for

organisms, effecting feeding, movement, and predator avoidance. Redistribution of sediments can alter nutrient distribution, dissolved oxygen levels, and primary productivity locally and throughout the estuarine waters (Parsons Brinckerhoff 2015). As described above, these sediment changes should be minimal and short-term and will not adversely impact the sediment budget in the overall Cooper River system. The use of the semi-permeable turbidity curtain around areas where pile driving is taking place would further reduce the potential for siltation.

#### **4.6.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

The impacts to Protected Species under Alternative 2 would be similar to those under the Proposed Project. The exception would be the location of pile driving impacts to aquatic species associated with the construction of the rail bridge crossing Noisette Creek along Spruill Avenue. The exact number of piles required for the rail bridge in this alternative is unknown; however, the underwater noise impacts from the pile drivings would be similar to the impacts for Noisette Creek as outlined in Table 4.6-3.

#### **4.6.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

The impacts to Protected Species under Alternative 3 would be similar to those under the Proposed Project.

#### **4.6.6      Alternative 4: Proposed Project Site (CSX: & NS – South via Milford)**

The impacts to Protected Species under Alternative 4 would be similar to those under the Proposed Project; however, there would be no pile driving impacts to fish species, marine mammals, and sea turtles in Noisette Creek.

#### **4.6.7      Alternative 5: River Center Site (CSX – South via Milford / NS – North via Hospital District)**

The impacts to Protected Species under Alternative 5 would be similar to those discussed under the Proposed Project.

#### **4.6.8      Alternative 6: River Center Site (CSX – South via Kingsworth / NS – North via Hospital District)**

The impacts to Protected Species under Alternative 6 would be similar to those under the Proposed Project.

#### 4.6.9 Alternative 7: River Center Site (CSX & NS – South via Milford)

The impacts to Protected Species under Alternative 7 would be similar to those under the Proposed Project.

#### 4.6.10 Related Activities

The Related Activities include two components, the Southern Rail Connection to existing CSX, which occurs for all alternatives, but has unique alignments for Alternatives 3 and 6, and the Northern Rail Connection to Norfolk Southern, which is only proposed for Alternative 2. Despite the unique rail alignments for Alternatives 3 and 6, impacts to available habitat for Protected Species are not different for those as described for the individual alternatives. Under Alternative 2, an additional Related Activity would be required to connect the NS arrival/departure tracks from the project site, crossing a portion of tidal salt marsh and tidal open water that drains to Noisette Creek, to the existing NCTC track along Virginia Avenue. The impacts to Protected Species associated with the Related Activity for each of these alternatives are expected to be similar to those discussed under the Proposed Project; however, the exception would be for the Related Activity associated with Alternative 2, which involves additional pile driving activities and underwater noise impacts to aquatic species associated with the construction of the rail bridge crossing a small tributary to Noisette Creek (Figure 4.5-2). The exact number of piles required for the rail bridge is unknown at this time; however, water depths in this tributary to Noisette Creek are similar to conditions modeled for Shipyard Creek. Therefore, underwater noise levels generated during pile driving of unattenuated piles would be similar to those for Shipyard Creek as presented in Table 4.6-3 and discussed in Section 4.6.3.

#### 4.6.11 Summary of Impacts Table

Tables 4.6-4 summarizes the environmental consequences and final determinations of effect to Protected Species from the No-Action Alternative, the Proposed Project (Alternatives 1 through 4), and the River Center project site (Alternatives 5 through 7). The final determination effect considers the use of the mitigation measures listed below to avoid and/or minimize potential impacts to aquatic species during construction of the Proposed Project.



Table 4.6-4  
Summary of Impacts, Protected Species

Alternative	Habitat Alteration/ Fragmentation	Species Displacement
<b>No-Action</b>	Negligible effect on habitat alteration/fragmentation with implementation of avoidance and minimization measures due to the continuation of mixed use and industrial land uses	Potential exists for direct and indirect species displacement during future land use activities but minor effects with implementation of avoidance and minimization measures in consultation with NMFS and USFWS as applicable
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Negligible effect on habitat alteration/fragmentation of Protected Species with implementation of avoidance and minimization measures during construction activities	Potential exists for direct and indirect effects during construction; but negligible with implementation of Applicant's prescribed avoidance and minimization measures in combination with the additional Corps mitigation measures listed in Section 4.6.12
<b>2: CSX – Milford / NS – S-line</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>3: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>4: CSX &amp; NS – Milford</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project) but in-water construction activities is limited to Shipyard Creek
<b>5: River Center Site: CSX – Milford / NS – North via Hospital District</b>	Negligible effect on habitat alteration/fragmentation of Protected Species with implementation of avoidance and minimization measures during construction	Potential exists for direct and indirect effects during construction, but minor effects with implementation of Applicant's prescribed avoidance and minimization measures in combination with the additional potential mitigation measures listed in Section 4.6.12
<b>6: River Center Site: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>7: River Center Site: CSX &amp; NS – Milford</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)

## 4.6.12 Mitigation

### 4.6.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Schedule in-water construction activities to avoid potential impacts to aquatic species. (Avoidance)
- Require contractors to use air bubble curtains or sleeve piles to mitigate underwater noise from pile driving activities. (Minimization)

These avoidance and minimization measures have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Navy Base ICTF is provided in Chapter 6, Table 6-1.

#### 4.6.12.2 Additional Potential Mitigation Measures

The following additional mitigation measures as recommended by the Corps would further minimize and/or reduce potential effects of the Proposed Project on Protected Species.

- Adherence to the following USFWS Manatee Guidelines during in-water construction:
  - The permittee will stop work if a manatee is seen near the project site.
  - The project manager shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel must monitor water-related activities for the presence of manatee(s) during May 15 through October 15.
  - The project manager shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973.
  - Any siltation barriers used during the project shall be made of material in which manatees cannot become entangled and must be properly secured, and regularly monitored to avoid manatee entrapment.
  - All vessels associated with the project shall operate a “no wake/idle” speeds at all times while in the construction area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.
  - If manatee(s) are seen within 100 yards of the active construction area all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area of its own volition.
  - Any collision with and/or injury to a manatee shall be reported immediately to Jim Valade of the U.S. Fish and Wildlife Service, North Florida Field Office, at (904) 731-3116.

- The permittee will also stop work if a turtle or sturgeon is seen near the project site during construction.
- The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25-40% of the pile driver's energy, followed by a one-minute waiting period.
- During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place.
- Adherence to environmental windows for construction during the winter months when sea turtles are less abundant.
- The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to aquatic Protected Species.
- Time of year and methods for preconstruction surveys for protected bird species will be coordinated with the USFWS.



## 4.7 ESSENTIAL FISH HABITAT

### 4.7.1 Methods and Impact Definitions

Potential impacts to EFH were addressed in the context of EFH species and habitat based on research, field observations, and best professional judgement. The level of detail to document existing resources within the study area is intended to provide data to analyze potential impacts to existing marine resources identified by NMFS and the field surveys. These data were used as a baseline to further analyze the alternatives through the process of minimization and avoidance. Impacts could include direct, indirect, site specific, or habitat impacts, including individual, cumulative, or synergistic consequences of actions.

Table 4.7-1  
Impact Definitions, Essential Fish Habitat

	Negligible	Minor	Major
<b>EFH</b>	Very small alteration to EFH, or to federally managed and/or common fishery species.	A small alteration (in quantity or extent) to EFH that does not impair a species' ability to live.	A large alteration that appreciably diminishes the value of EFH for survival of a species.

### 4.7.2 No-Action Alternative

Under the No-Action Alternative, the project site and the River Center project site would continue to be used for mixed use industrial activities. While future land uses and human activities may occur adjacent to and/or within aquatic environments within the study area, it would be speculative to attempt to estimate the acreage of impacts to EFH at this time. Therefore, the acreage of impacts to EFH is unknown, but EFH habitat could experience an adverse impact if these future activities resulted in a reduction in quantity and/or quality of EFH habitat. While population assessments and trends of EFH species are evaluated regularly by NMFS, and the species response to management plans varies widely, future actions under the No-Action Alternative would result in a negligible adverse impact to EFH and federally managed and common fishery species (listed in Table 3.7-1).

### 4.7.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)

EFH located within the study area includes estuarine emergent marsh, oyster reefs/shell banks, intertidal flats, and estuarine water column. EFH and all impacts associated with the Proposed Project are described in detail in Appendix E (EFH Assessment). The following sections provide a brief summary of the impacts described in the EFH Assessment.

Under Alternative 1 (Proposed Project), construction and/or improvements to the rail bridges adjacent to and within Noisette Creek and Shipyard Creek and construction of the drayage road and

arrival/departure tracks would directly impact EFH within the study area. As such, construction activities could affect multiple life history stages of all the federally managed species identified in Table 3.7-1. Specific activities such as the placement of fill to construct the drayage road and pilings to complete bridge improvements would directly impact 8.95 acres of estuarine emergent marsh, 1.31 acres of intertidal flats, and 1.31 acres of the estuarine water column (Figure 4.7-1), which is adjacent to existing industrial land uses and is approximately 1 percent of the total EFH acreage in the study area (see Appendix E).

Other sources that could indirectly impact EFH include shading from bridges, noise resulting from construction and operation activities, and temporary physical barriers from the use of BMPs (e.g., floating semi-permeable turbidity curtains) outlined in Section 4.7.12 from pile installation in Noisette and Shipyard Creek. The NMFS Pile Driving Calculator Model was used to assess the potential underwater noise impacts from pile driving activities on federally managed species for the Proposed Project (NMFS 2015). Underwater noise impacts to federally managed species associated with the Proposed Project are described in detail in Section 4.6, Protected Species, and Appendix E.

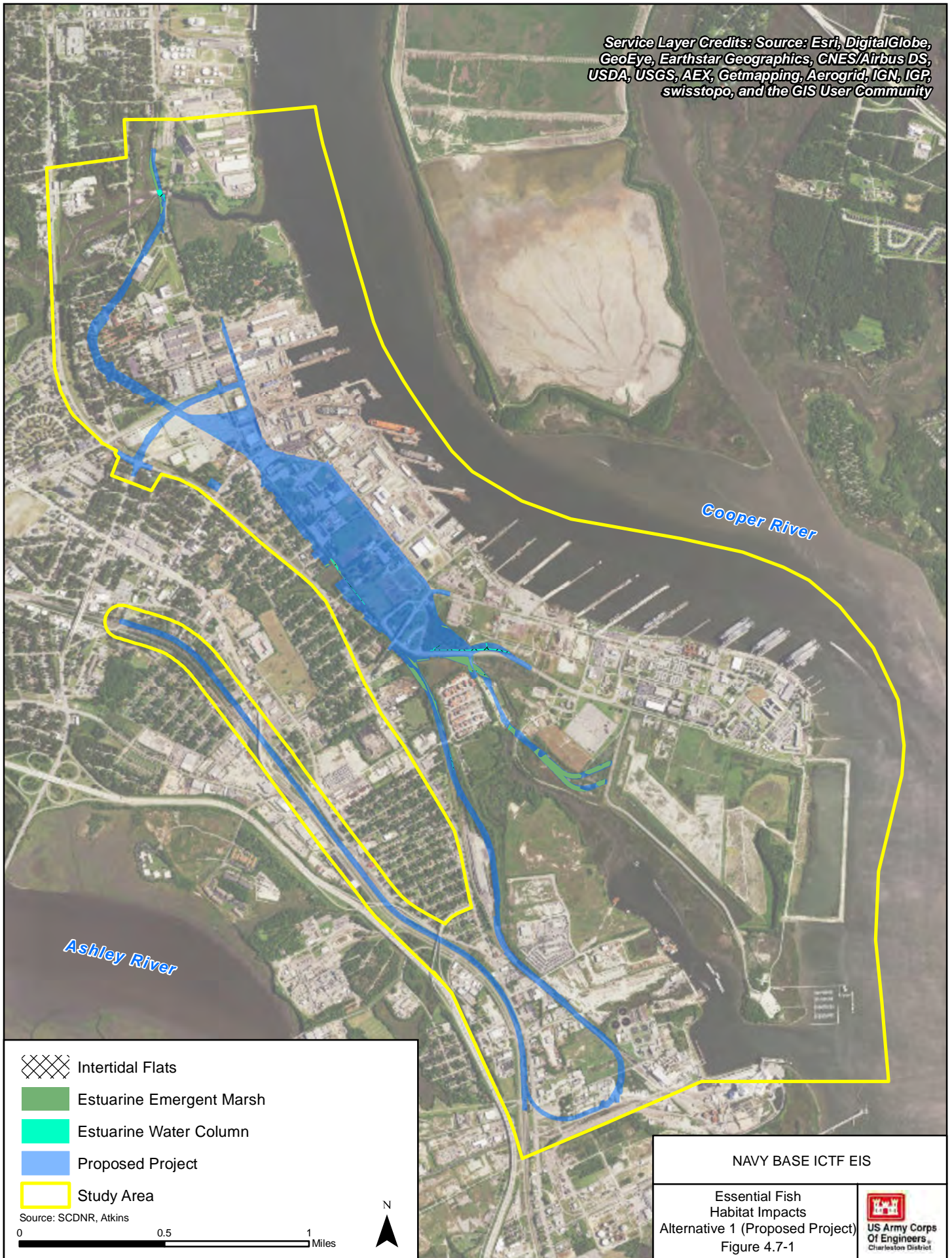
Additionally potential spills of contaminants may occur during construction and operation activities; however, the implementation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan may minimize the impact of a potential spill event on EFH. Circulation patterns within Noisette Creek and Shipyard Creek are not expected to be altered. In summary, construction of the Proposed Project would have minor impacts to EFH and federally managed species.

Construction of the Proposed Project would result in the permanent loss of estuarine emergent marsh EFH. The loss of habitat reduces nursery areas and refuge for the federally managed and common recreational and commercial fishery species (e.g., white and brown shrimp). A reduction in marsh habitat can reduce prey opportunities, while at the same time increase predation due to the loss/reduction of cover and refuge areas. The presence of construction equipment adjacent to and/or within the EFH, and the resulting noise, may also result in the temporary displacement of federally managed species residing in this area; however, impacts to federally managed and common species that use estuarine emergent marsh EFH would be minor since the Proposed Project would not affect federally managed species at the population level.

Because of the distance between proposed construction activities under Alternative 1 (Proposed Project) and the location of oyster reefs/shell banks in the study area, there would be no direct impact on this EFH. Oyster clusters that are located on bridge pilings may be directly impacted during bridge improvements in Noisette Creek; however, this impact would be a temporary impact on EFH since new pilings installed in the area would provide structure for future oyster settlement and propagation. The potential for an indirect, temporary, water quality impact (e.g., sedimentation, turbidity) to the oyster reefs/shell banks EFH in the study area would be reduced to a negligible effect with the use of applicable BMPs discussed in Section 4.1 (Geology and Soils) and Section 4.3 (Water Quality).



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The direct impact to intertidal flats EFH would be minor due to the amount of available intertidal habitat that would not be impacted by the Proposed Project within the study area. These impacts would result from the construction of the new rail bridges and include the potential for localized, temporary increases in sedimentation; permanent physical barriers to species movement from new piling installation; and temporary physical barriers to species movement from the implementation of BMPs (e.g., floating semi-permeable turbidity curtains) during construction. Loss of habitat could result in a minor impact to federally managed and common fishery species that use the EFH for foraging and refuge. Noise impacts, and the presence of nearby human activity, could also result in the temporary displacement of federally managed and common fish species that inhabit the intertidal flats EFH.

The direct impact to estuarine water column EFH would be minor due to the amount of available estuarine water column that would not be impacted by the Proposed Project within the study area. Other impacts to this EFH associated with construction of the Proposed Project include the potential for localized, temporary increases in sedimentation (and turbidity); reduced dissolved oxygen levels; permanent physical barriers to species movement from new piling installation; and temporary physical barriers to species movement from the implementation of BMPs (e.g., floating turbidity curtains) during construction. Increases in sedimentation and turbidity may result in a minor impact to federally managed and common fishery species and the estuarine food chain, but any adverse impacts would be minimized through the use of BMPs discussed in Section 4.1 (Geology and Soils) and Section 4.3 (Water Quality).

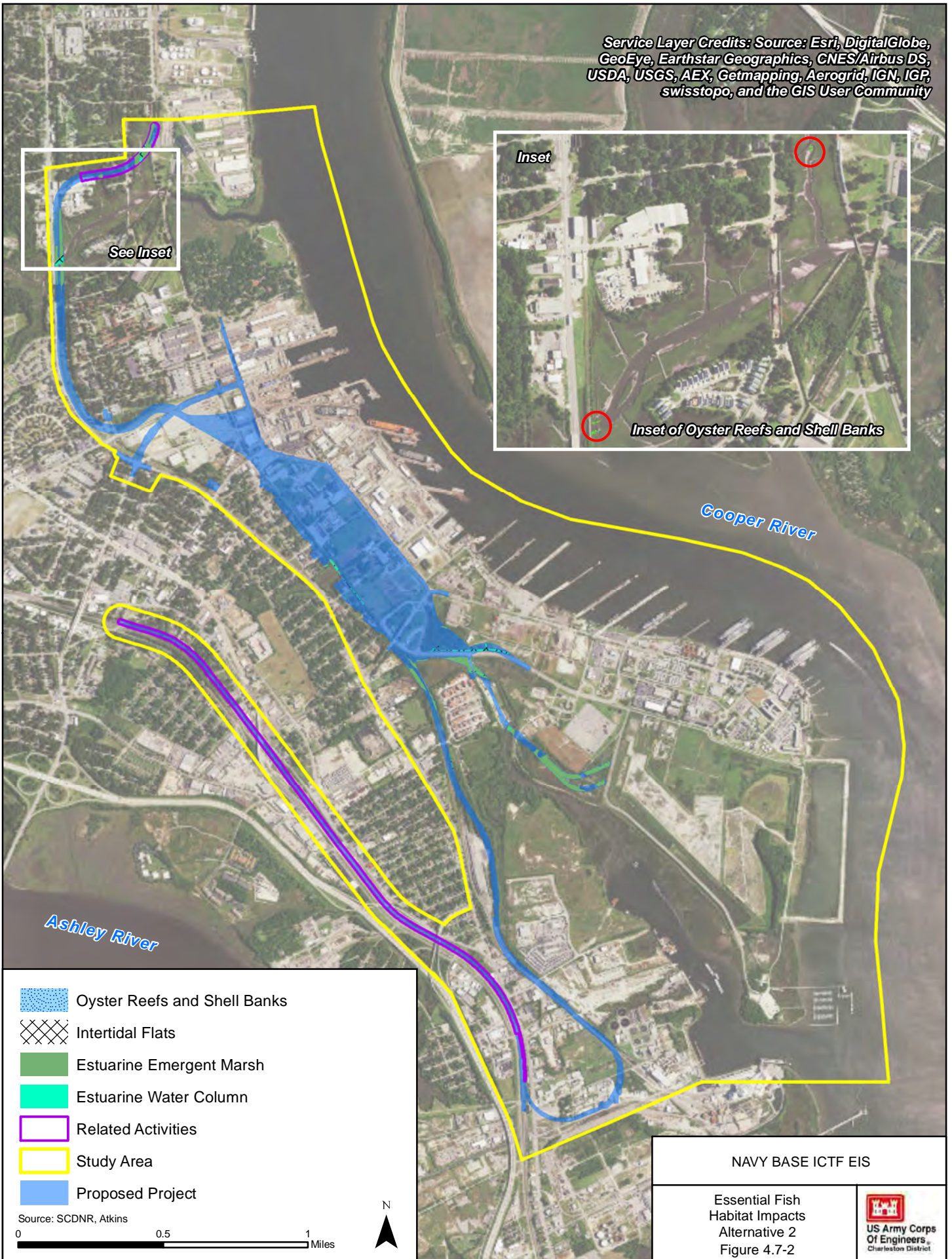
#### **4.7.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

Alternative 2 is a variation of the Proposed Project where the northern rail connection for NS would be relocated along Spruill Avenue within existing CSX ROW to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line. Alternative 2 would require a bridge crossing over Noisette Creek adjacent to Spruill Avenue, rather than near Noisette Boulevard. The placement of fill and pilings associated with construction of Alternative 2 would directly impact 10.24 acres of estuarine emergent marsh, 0.03 acre of oyster reefs/shell banks, 1.34 acres of intertidal flats, and 1.34 acres of the estuarine water column (Figure 4.7-2).

#### **4.7.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Under Alternative 3, the intermodal facility would include all of the facility components of the Proposed Project, and road improvements would be the same as those identified in the Proposed Project. The arrival/departure design would be the same as described in the Proposed Project; however, the southern rail connection for CSX would connect to an existing CSX rail line near

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Kingsworth Avenue (and adjacent to existing NS rail and ROW), which would require acquisition of a new ROW. The placement of fill and pilings associated with construction of Alternative 3 would directly impact 9.11 acres of estuarine emergent marsh, 1.34 acres of intertidal flats, and 1.34 acres of the estuarine water column (Figure 4.7-3).

#### **4.7.6      Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

Under Alternative 4, the intermodal facility would include all of the facility components of the Proposed Project, and road improvements would be the same as those identified in the Proposed Project. Rail improvements would be similar to those described for the CSX southern rail connection as part of the Proposed Project, with the exception that a second track would need to be constructed for NS, which would then tie into the existing NS rail lines. To the north of the intermodal facility, a rail spur or tail track is proposed to extend from the facility through the Hospital District but would stop short of Noisette Creek. The placement of fill and pilings associated with construction of Alternative 4 would directly impact 8.04 acres of estuarine emergent marsh, 1.02 acres of intertidal flats, and 1.02 acres of the estuarine water column (Figure 4.7-4).

#### **4.7.7      Alternative 5: River Center Site (CSX – South via Milford / NS – North via Hospital District)**

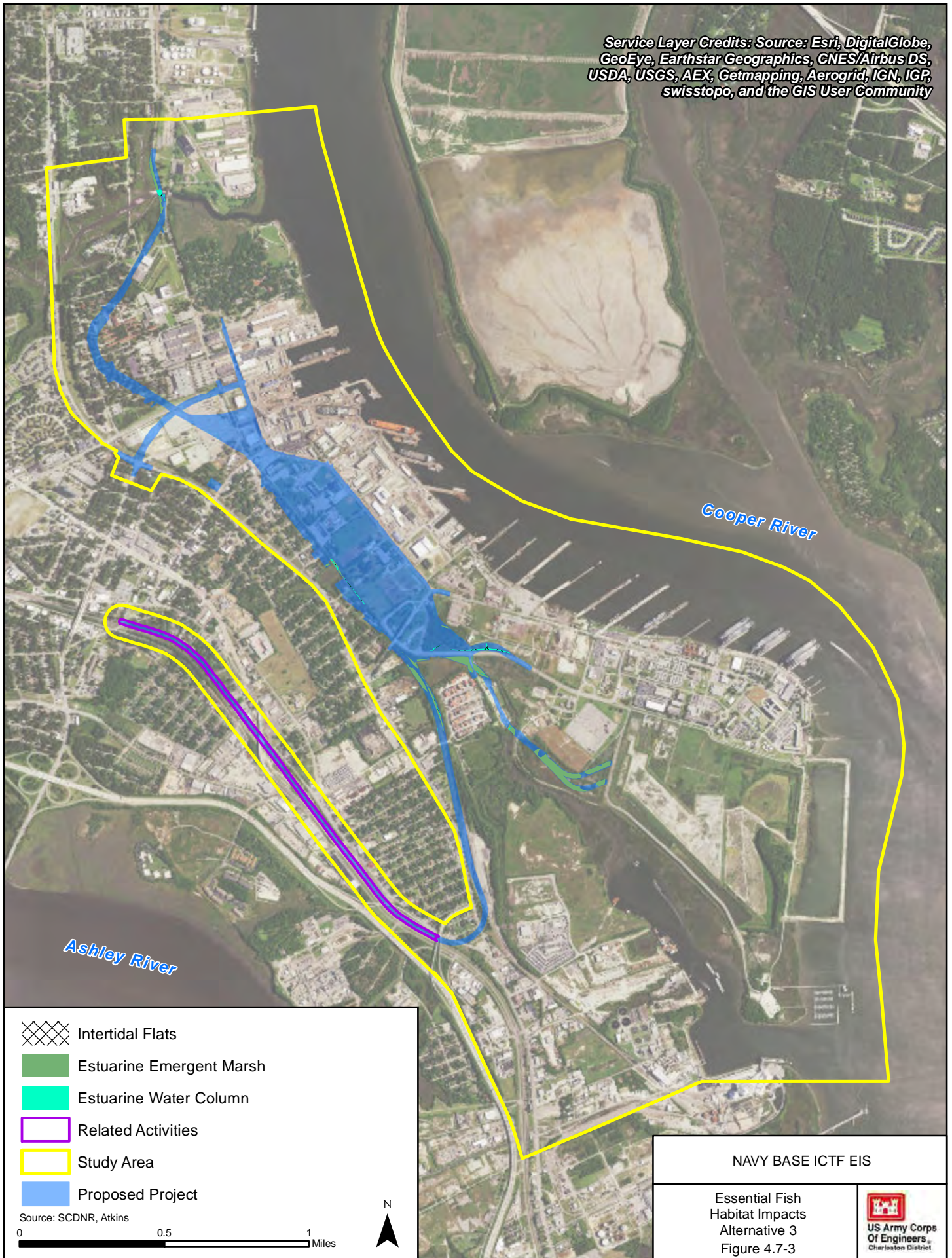
Alternative 5 is a variation of the Proposed Project with the ICTF being moved to the River Center project site. The intermodal facility would include all of the facility components of the Proposed Project, with the exception that a sound attenuation and security wall would be constructed adjacent to Noisette Boulevard along the length of the eastern boundary of the facility site. To accommodate NS rail access, a new rail bridge would be constructed similar to the one described under the Proposed Project. The NS rail connection would cross Noisette Creek and tie into the existing NCTC tracks along Virginia Avenue. The placement of fill and pilings associated with the construction of Alternative 5 would directly impact 9.41 acres of estuarine emergent marsh, 1.10 acres of intertidal flats, and 1.10 acres of the estuarine water column (Figure 4.7-5).

#### **4.7.8      Alternative 6: River Center Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Under Alternative 6, the intermodal facility would include all of the facility components, road improvements, and northern rail connection as described in Alternative 5. Rail improvements would be similar to those described for the CSX southern rail connection in Alternative 5, with the exception that the southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW) and would require acquisition of new ROW. The

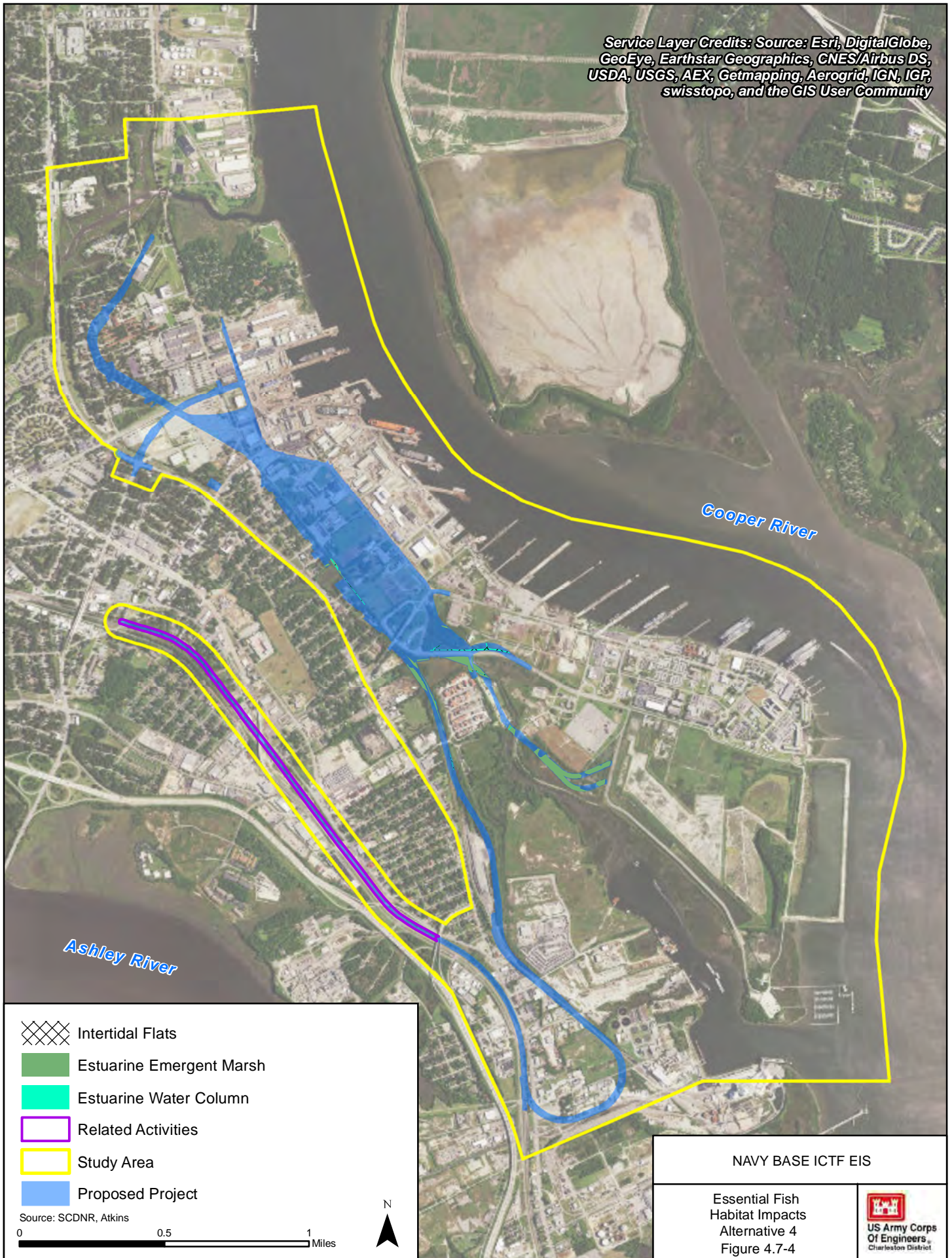


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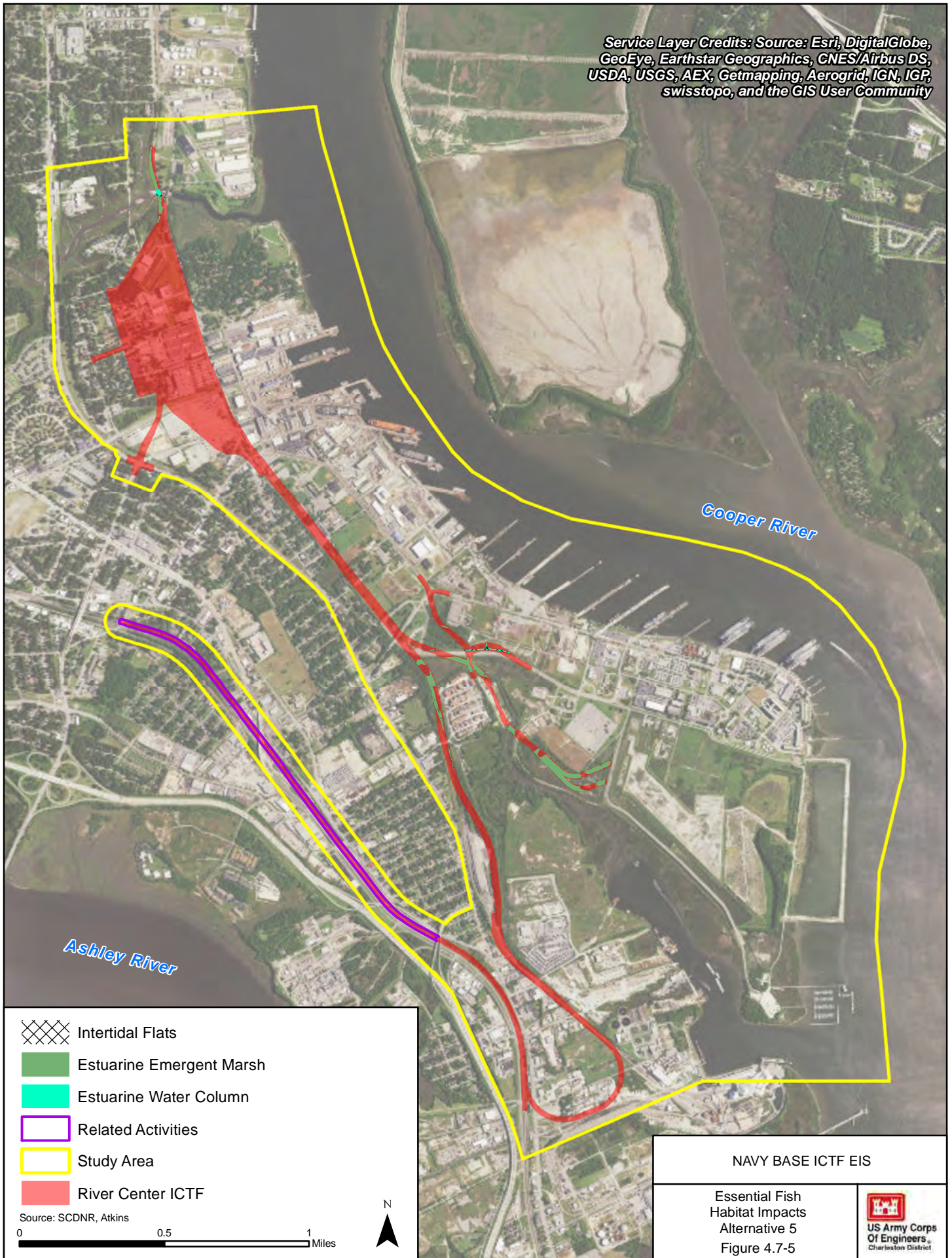


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placement of fill and pilings associated with the construction of Alternative 6 would directly impact 9.41 acres of estuarine emergent marsh, 1.02 acres of intertidal flats, and 1.02 acres of the estuarine water column (Figure 4.7-6).

#### **4.7.9            Alternative 7: River Center Site (CSX & NS – South via Milford)**

Under Alternative 7, the intermodal facility would include all of the facility components of the Proposed Project, with the exception that the sound attenuation and security wall would be constructed adjacent to Noisette Boulevard along the length of the eastern boundary of the site. Operational activities and roadway improvements for Alternative 7 would be the same as those described under Alternative 5 with the exception of the NS rail access which would enter and exit the Navy Base ICTF from a southern rail connection. Rail improvements and modifications would be similar to those described under Alternative 5. The placement of fill and pilings associated with the construction of Alternative 7 would directly impact 8.33 acres of estuarine emergent marsh, 0.86 acre of intertidal flats, and 0.86 acre of the estuarine water column (Figure 4.7-7).

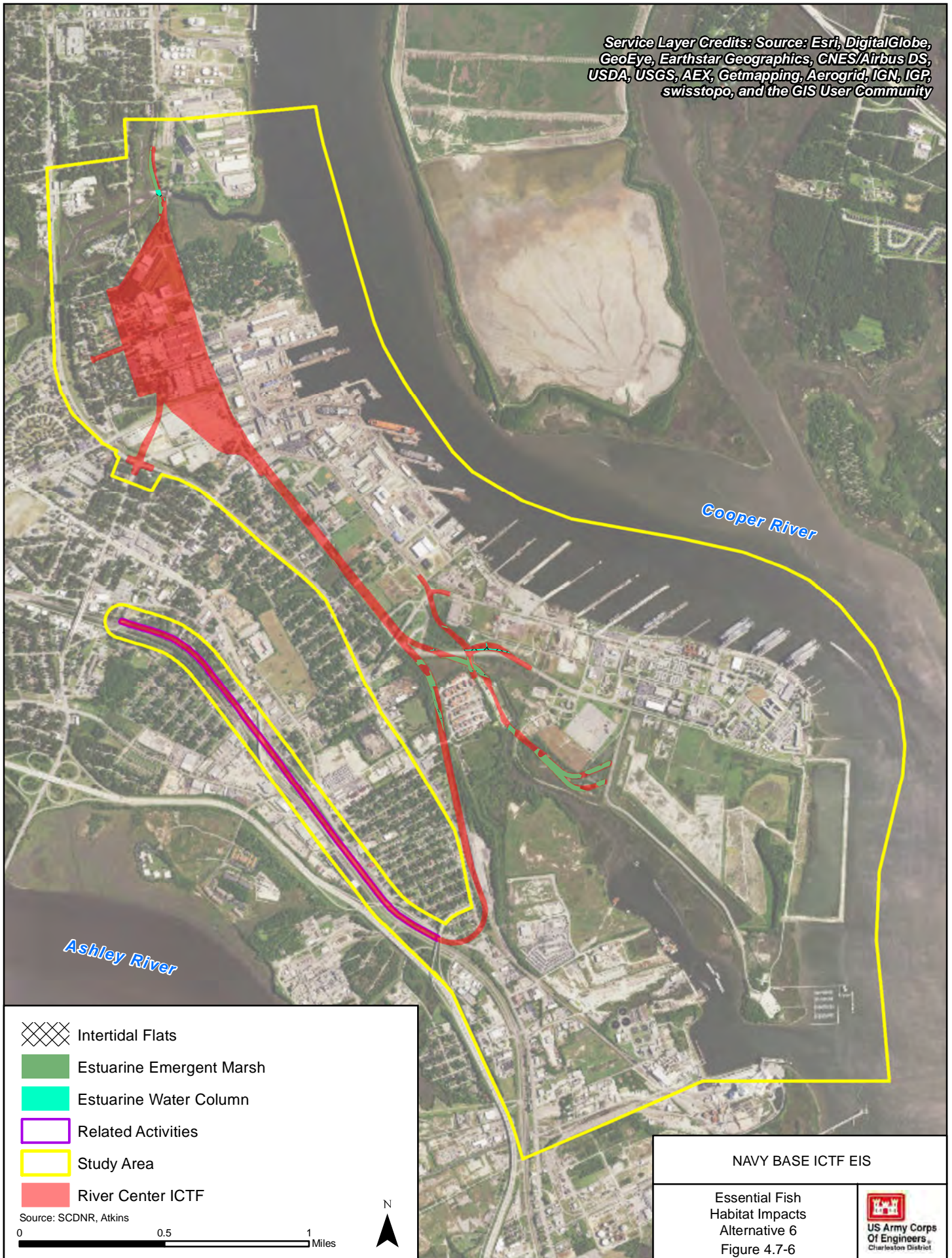
#### **4.7.10           Related Activities**

The Related Activities include two components, the Southern Rail Connection to existing CSX, which occurs for all alternatives, but has unique alignments for Alternatives 3 and 6, and the Northern Rail Connection to Norfolk Southern, which is only proposed for Alternative 2. Despite the unique rail alignments for Alternatives 3 and 6, impacts to EFH for those sections have been successfully avoided. Under Alternative 2, the placement of pilings associated with construction of the Related Activity (a new railroad bridge across a portion of marsh that drains Noisette Creek) would directly impact 1.60 acres of estuarine emergent marsh, 0.007 acre of oyster reefs/shell banks, 0.20 acre of intertidal flats, and 0.20 acre of the estuarine water column. There would be no other impacts to EFH from construction of the Related Activity associated with each of the other project alternatives.

#### **4.7.11           Summary of Impacts Table**

Table 4.7-2 summarizes the environmental consequences to EFH from the No-Action Alternative, the Proposed Project (Alternatives 1 through 4), and the River Center Site (Alternatives 5 through 7).

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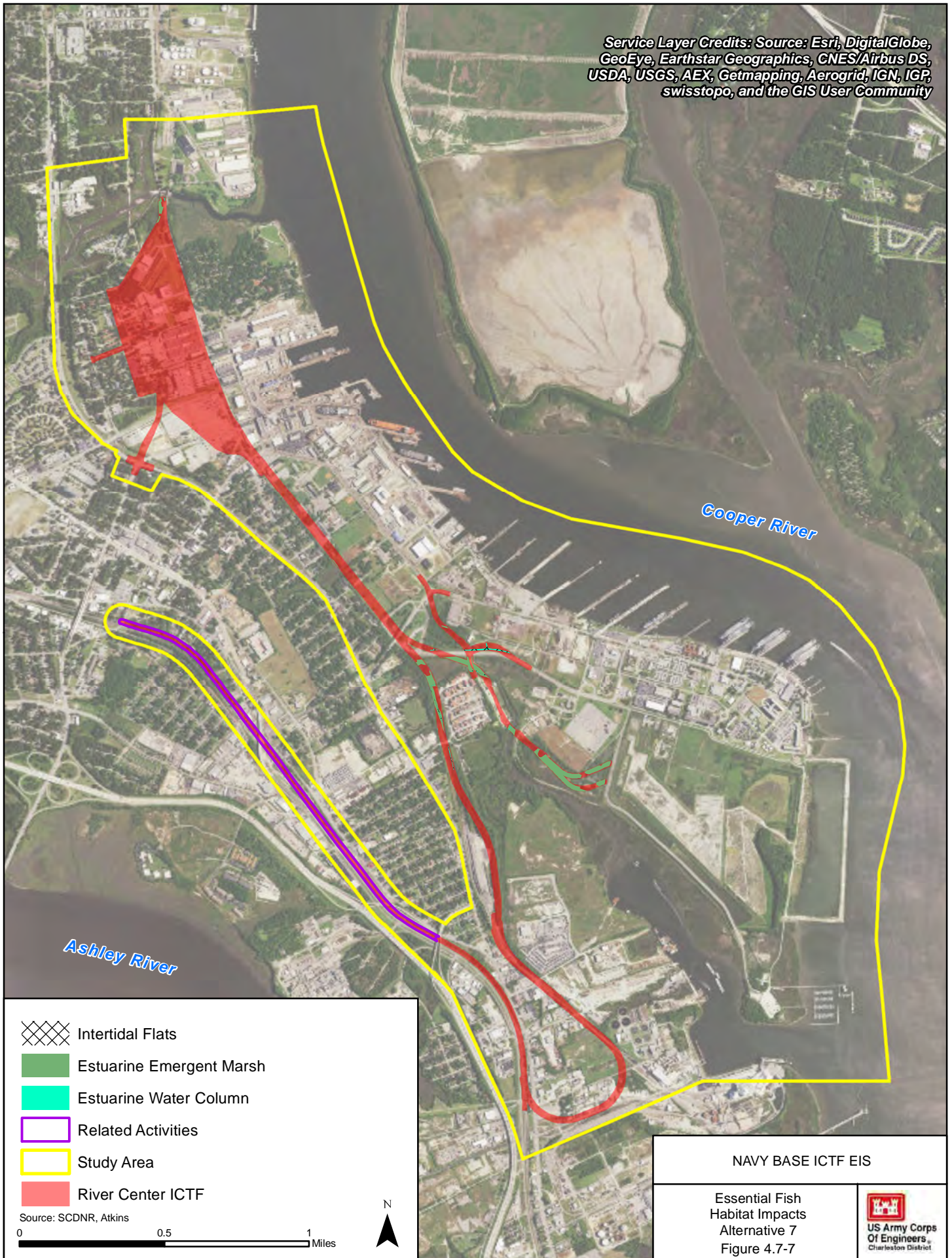




Table 4.7-2  
Summary of Impacts, Essential Fish Habitat

Alternative	Habitat Loss	Federally Managed and Common Fishery Species Displacement
<b>No-Action</b>	Negligible effect on EFH that currently exists within the study area	Negligible Potential exists for a small impact (in number, quantity, or extent) to federally managed species during construction; common fishery species (brown and white shrimp) are relatively abundant and adapted to living in close association with human activity and infrastructure
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Minor Approximately 11.57 acres of EFH would be removed	Minor Potential exists for a small impact to federally managed species during construction; common fishery species (brown and white shrimp) are relatively abundant and adapted to living in close association with human activity and infrastructure  Negligible impact to oysters with the implementation of water quality BMPs and the potential for future oyster settlement and propagation with the new pilings.
<b>2: CSX – Milford / NS – S-line</b>	Minor Approximately 12.95 acres of EFH, including 0.03 acre of oyster reefs/shell banks, would be removed.	Same as Alternative 1
<b>3: CSX – Kingsworth / NS – Hospital</b>	Minor Approximately 11.79 acres of EFH would be removed	Same as Alternative 1
<b>4: CSX &amp; NS – Milford</b>	Minor Approximately 10.08 acres of EFH would be removed	Same as Alternative 1
<b>5: River Center Site: CSX – Milford / NS – North via Hospital District</b>	Minor Approximately 11.61 acres of EFH would be removed	Minor Potential exists for a small impact to federally managed species during construction; common fishery species are relatively abundant and adapted to living in close association with human activity and infrastructure
<b>6: River Center Site: CSX – Kingsworth / NS – Hospital</b>	Minor Approximately 11.45 acres of EFH would be removed	Same as Alternative 5
<b>7: River Center Site: CSX &amp; NS – Milford</b>	Minor Approximately 10.05 acres of EFH would be removed	Same as Alternative 5

## 4.7.12 Mitigation

### 4.7.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Where possible, limit the placement of pilings for bridges within waterways, ensuring channels are not blocked. (Minimization)
- Require contractors to use air bubble curtains or sleeve piles to mitigate noise from pile driving activities. (Minimization)

These avoidance and minimization measures have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Proposed Project is provided in Chapter 6, Table 6.1.

### 4.7.12.2 Additional Potential Mitigation Measures

The following additional mitigation measures as recommended by the Corps would further minimize and/or reduce potential effects of the Proposed Project on EFH.

- The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25-40% of the pile driver's energy, followed by a one-minute waiting period.
- During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place.
- Adherence to environmental windows for construction during the winter months when sea turtles are less abundant.
- The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to marine resources and EFH.
- Implement a SPCC Plan to minimize the impact of a potential spill event on EFH.

## 4.8 TRAFFIC AND TRANSPORTATION

The Proposed Project would alter vehicular and rail traffic patterns within the TSA. Section 3.8 describes the existing transportation system infrastructure and operations. The purpose of this environmental consequences section is to document potential beneficial or adverse impacts to the transportation system that would result from construction and operation of the project.

Transportation projects included in the No-Action and project alternatives analysis are consistent with the following local transportation plans:

- 2035 Charleston Area Transportation Study (CHATS) Long Range Transportation Plan (LRTP)
- SCDOT Statewide Transportation Improvement Program (STIP) 2014-2019, May 2014 Revision

Within the TSA, the Port Access Road project is the only committed roadway project included in the future year analysis. The Port Access Project will replace the existing I-26 directional interchange at Spruill Avenue with a full movement interchange connecting to the future Port Access Road. The Port Access Road will connect to the future HLT and include a half-diamond interchange with a local access roadway providing connectivity to Hobson Avenue, Bainbridge Avenue and Spruill Avenue. Roadway improvements associated with the Port Access Road are shown in Figure 4.8-1.

Despite being partially funded for construction in the FY 2014-2019 CHATS TIP financial statement, due to uncertainties with what improvements will be made, the I-526 improvements project from I-26 west to SC 7 (Sam Rittenberg Boulevard) was not included in the future year analysis. Also, the proposed Airport Connector Road on new alignment between Montague Avenue and Michaux Parkway was not included due to uncertainties with the design.

In addition, *Partnership for Prosperity: A Master Plan for the Neck Area of Charleston and North Charleston (Neck Area Plan)* is currently being developed BCDCOG. The Neck Area Plan will provide a clear, community-based vision for growth and redevelopment of key sites in the area and future transportation networks, while providing economic opportunity and preserving the historic fabric of those neighborhoods. Focusing on the transportation component, the plan is to develop a transportation system that provides options in mode of travel for both people and goods. The plan will increase safety, mobility and access through the use of access management, directing truck traffic, planning for transit and creating more pedestrian friendly roadways.

### 4.8.1 Methods and Impact Definitions

The following section describes the methodology used to evaluate and define impacts to the transportation network.



**Methods:** Traffic forecasts were developed using the 2012 version of the BCDCOG/CHATS 2010-2035 travel demand model. A travel demand model estimates traffic demand on regional transportation infrastructure based on the magnitude and location of population and employment in the region. Mathematical parameters within the travel demand model are initially estimated and calibrated to ensure the model accurately represents existing travel characteristics when given existing population and employment inputs and existing infrastructure. Then future traffic demands are estimated by applying the model using regional forecasts of the future magnitude and location of population and employment, and planned future infrastructure.

Atkins developed a traffic forecast for each future year alternative as documented in Appendix F. In summary, traffic forecasts were developed by first estimating the movement of heavy trucks to and from port terminals and intermodal rail facilities for each alternative. These externally estimated trips were introduced into the BCDCOG/CHATS travel demand model, along with population and employment inputs associated with each alternative, as well as transportation network revisions associated with each alternative. Alternative specific inputs were used in travel demand model applications to generate the regional travel flows associated with each alternative. Since existing North Charleston truck restrictions, which are shown in Figure 4.8-1, are important in the TSA but are not currently included in the regional travel demand model, travel flows estimated for each alternative were used in refined travel demand model traffic assignments that included truck restrictions that are enforced in North Charleston. The resulting traffic volumes were used to generate the final traffic forecasts.

The traffic forecast volumes were used to evaluate the operations of the roadway network for each of the future year alternatives. The future year operations analysis is documented in Appendix F. The methodology used to perform the operations analysis and definitions of LOS is provided in Section 3.8.2.

**Impact Definitions:** Adverse and beneficial impacts to the freeway and local roadway network were determined by comparing the operations of the No-Action and project alternatives. LOS was used to determine impacts to freeways, intersections and at-grade rail crossings as defined in Table 4.8-1. LOS A to C is considered Good, LOS D Fair and LOS E or F Poor. In addition, for at-grade rail crossings, an impact was major if an interstate off-ramp queue would spillback to the mainline in a project alternative as a result of a Navy Base ICTF intermodal train occurrence but would not in the No-Action Alternative as a result of an other commodity train. An off-ramp would be impacted by a train occurrence at an at-grade rail crossing if the queue on the roadway backs up to the off-ramp. This queue hinders traffic from being able to turn onto the roadway from the off-ramp.

Table 4.8-1  
Impact Definitions, Traffic and Transportation

Negligible	Minor	Moderate	Major
No change in LOS. No perceivable impacts to the intersection delay, at-grade rail crossing delay or freeway density.	LOS changes one LOS grade. Impacts cause slightly perceptible change in intersection delay, at-grade rail crossing delay or freeway density.	LOS changes two LOS grades or LOS degrades (adverse impact) to LOS E or improves (beneficial impact) from LOS E to LOS D. Impacts cause perceptible change in intersection delay, at-grade rail crossing delay or freeway density.	LOS changes three or more LOS grades or LOS degrades (adverse impact) to LOS F or improves (beneficial impact) from LOS F to LOS E or LOS D. Additionally, for at-grade rail crossings, if off-ramp queue impacts interstate mainline. Impacts cause very noticeable change in intersection delay, at-grade rail crossing delay or freeway density.

## 4.8.2 No-Action Alternative

The following sections describe the transportation impacts associated with No-Action Alternative, which is described in detail in Section 2.4.1 The operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. The No-Action Alternative impacts are summarized in Section 4.8.10.

Existing traffic patterns within the TSA change due to the Port Access Road project. While the proposed HLT would not be opened in 2018, the Port Access Road project is expected to be completed. The Port Access Road project would alter traffic patterns in 2018 with the addition of the Port Access Road and Local Access Road and the replacement of the directional I-26 Spruill Avenue ramps, which provide movements to and from downtown Charleston only, with the Port Access Road interchange. With the HLT open by the design year 2038, traffic volumes on the Port Access Road increase substantially. The existing year 2013 and No-Action Alternative daily volumes for the major roadways within the TSA are shown in Appendix F. The average annual growth rate for the No-Action Alternative would be a little under 2 percent on the major roadways between the existing year 2013 and opening year 2018. Traffic growth slows down to less than 1 percent from the opening year 2018 to the design year 2038.

### Interstate 26

Consistent with the existing conditions, most of the congestion would occur in the eastbound direction in the morning and westbound in the evening for the opening year 2018 No-Action

Alternative. Approximately 12 percent of the total analyzed segments would operate at Poor LOS and 26 percent would operate at Fair LOS, which is nearing unstable traffic flow.

By the design year 2038, the number of I-26 freeway segments over capacity would double from the opening year 2018. The additional segments operating over capacity would occur in the peak direction of travel, which is eastbound in the AM peak hour and westbound in the PM peak hour. Approximately 22 percent of the total analyzed segments would operate at Poor LOS and 27 percent would operate at Fair LOS, which is nearing unstable traffic flow.

A summary of the opening year 2018 and design year 2038 No-Action Alternative I-26 freeway segment LOS by direction and peak hour is shown in Table 4.8-2.

Table 4.8-2  
I-26 Operations, No-Action Alternative

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	14 Segments (33%)	12 Segments (29%)	37 Segments (88%)	30 Segments (71%)	35 Segments (92%)	29 Segments (76%)	13 Segments (34%)	10 Segments (26%)
Fair	19 Segments (45%)	10 Segments (24%)	3 Segments (7%)	10 Segments (24%)	1 Segment (3%)	7 Segments (19%)	19 Segments (50%)	16 Segments (42%)
Poor	9 Segments (22%)	20 Segments (47%)	2 Segments (5%)	2 Segments (5%)	2 Segments (5%)	2 Segments (5%)	6 Segments (16%)	12 Segments (32%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-26.

Source: Appendix F.

## Interstate 526

By the year 2018, congestion would occur on a greater portion of the corridor due to growth in traffic, in part due to the proposed Boeing Aircraft plant expansion (see description in Chapter 5). The majority of the congestion along I-526 would occur between Paul Cantrell Boulevard and Long Point Road. Approximately 23 percent of the total analyzed segments would operate at Poor LOS and 40 percent would operate at Fair LOS, which is nearing unstable traffic flow.

By the design year 2038, the number of I-526 freeway segments over capacity would increase by approximately one-third from the opening year 2018. The majority of the congestion along I-526 would still occur between Paul Cantrell Boulevard and Long Point Road. Approximately 31 percent of the total analyzed segments would operate at Poor LOS and 36 percent would operate at Fair LOS, which is nearing unstable traffic flow.



A summary of the opening year 2018 and design year I-526 freeway segment LOS by direction and peak hour is shown in Table 4.8-3.

Table 4.8-3  
I-526 Operations, No-Action Alternative

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	17 Segments (38%)	15 Segments (33%)	13 Segments (29%)	14 Segments (31%)	16 Segments (37%)	14 Segments (33%)	19 Segments (44%)	15 Segments (35%)
Fair	17 Segments (38%)	13 Segments (29%)	22 Segments (49%)	18 Segments (40%)	15 Segments (35%)	13 Segments (30%)	16 Segments (37%)	19 Segments (44%)
Poor	11 Segments (24%)	17 Segments (38%)	10 Segments (22%)	13 Segments (29%)	12 Segments (28%)	16 Segments (37%)	8 Segments (19%)	9 Segments (21%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-526.

Source: Appendix F.

## U.S. Highway 17

Although congestion is projected to increase on US 17 from existing levels, the majority of the corridor would still operate at a Good or Fair levels. Only one freeway segment and one intersection (4 percent of the total analyzed elements) would operate at Poor LOS in either the AM or PM peak hour.

By the design year 2038, the number of freeway segments and intersections over capacity would more than double along US 17 from the opening year 2018. However, because few locations operated over capacity in 2018, the majority of the corridor would still operate at a Good or Fair levels in the design year 2038. Only two freeway segments and three intersections (10 percent of the total analyzed elements) would operate at Poor LOS in either the AM or PM peak hour.

A summary of the opening year 2018 and design year 2038 US 17 freeway segment LOS by direction and peak hour is shown in Table 4.8-4. A summary of the opening year 2018 and design year 2038 US 17 signalized intersection operations is shown in Table 4.8-5. The worst of the No-Action Alternative AM or PM peak hour LOS for the opening year 2018 is shown in Figure 4.8-2 and the design year 2038 in Figure 4.8-3.

Table 4.8-4  
US 17 Freeway Operations, No-Action Alternative

LOS	Northbound				Southbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	9 Segments (90%)	9 Segments (90%)	8 Segments (80%)	5 Segments (50%)	10 Segments (91%)	8 Segments (73%)	11 Segments (100%)	10 Segments (91%)
Fair	1 Segment (10%)	1 Segment (10%)	1 Segment (10%)	3 Segments (30%)	1 Segment (9%)	3 Segments (27%)	0 Segments (0%)	1 Segment (9%)
Poor	0 Segments (0%)	0 Segments (0%)	1 Segment (10%)	2 Segments (20%)	0 Segments (0%)	0 Segments (0%)	0 Segments (0%)	0 Segments (0%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between northbound and southbound US 17.

Source: Appendix F.

Table 4.8-5  
US 17 Intersection Operations, No-Action Alternative

LOS	AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038
Good	3 Intersections (60%)	2 Intersections (40%)	2 Intersections (40%)	2 Intersections (40%)
Fair	1 Intersection (20%)	2 Intersections (40%)	3 Intersections (60%)	1 Intersection (20%)
Poor	1 Intersection (20%)	1 Intersection (20%)	0 Intersections (0%)	2 Intersections (40%)

Source: Appendix F.

### North Charleston Intersections

The opening year 2018 No-Action Alternative analyzed 32 signalized intersections and 15 stop-controlled intersections within North Charleston, which are shown in Figure 4.8-2. The proposed Port Access Road project would create additional intersections as well as modify existing intersections with the addition of turn lanes and traffic signals. Along the proposed Local Access Road, two new signalized intersections are created at Bainbridge Avenue and the Stromboli Avenue Extension and two unsignalized intersections at the Port Access Road on- and off-ramps. Additionally the project would extend Stromboli Avenue converting the two existing stop-controlled intersections of Spruill Avenue at Stromboli Avenue and Carner Avenue and Meeting Street (future Stromboli Avenue Extension) to signalized intersections. Meeting Street would no longer connect to Carner Avenue as part of the Port Access Road project.

Similar to existing conditions, within North Charleston, the majority of the analyzed intersections operate with little delay. During the AM peak hour, all 32 signalized intersections and 11 stop-controlled intersections would operate at Good LOS (92 percent of total intersections), one stop-controlled intersection would operate at Fair LOS (2 percent of total intersections), and three stop-

controlled intersections would operate at Poor LOS (6 percent of total intersections). During the PM peak hour, 30 signalized intersections and 14 stop-controlled intersections would operate at Good LOS (94 percent of total intersections), two signalized intersections and one stop-controlled intersection would operate at Fair LOS (6 percent of total intersections), and none would operate at Poor LOS (0 percent of total intersections). The stop-controlled intersections of Avenue B at Virginia Avenue, the I-526 Eastbound Off-Ramp at Virginia Avenue, and the ramps from Viaduct Road at Bainbridge Road are the only intersections that would operate with a Poor LOS. The worst of the AM and PM peak hour intersection LOS for the opening year 2018 No-Action Alternative is shown in Figure 4.8-2.

In the design year 2038 No-Action Alternative, the majority of the intersections within North Charleston would continue to operate with little delay. During the AM peak hour, 30 signalized intersections and ten stop-controlled intersections would operate at Good LOS (85 percent of total intersections), one signalized and one stop-controlled intersection would operate at Fair LOS (4 percent of total intersections), and one signalized and four stop-controlled intersections would operate at Poor LOS (11 percent of total intersections). During the PM peak hour, 27 signalized intersections and ten stop-controlled intersections would operate at Good LOS (79 percent of total intersections), three signalized intersections and four stop-controlled intersection would operate at Fair LOS (15 percent of total intersections), and two signalized and one stop-controlled intersections would operate at Poor LOS (6 percent of total intersections).

In addition to the three opening year 2018 No-Action stop-controlled intersections that operated at Poor LOS, four other intersections will also operate at Poor LOS in the design year 2038. The four additional intersections are the signalized intersections of Rivers Avenue at Cosgrove Avenue, Spruill Avenue at McMillan Avenue, and Cosgrove Avenue at Azalea Avenue and the stop-controlled intersection of Noisette Boulevard at McMillan Avenue. The worst of the AM and PM peak hour intersection LOS for the design year 2038 No-Action Alternative is shown in Figure 4.8-3.

A summary of the opening year 2018 and design year 2038 North Charleston intersection LOS by traffic control type and peak hour is shown in Table 4.8-6.

Table 4.8-6  
North Charleston Intersection Operations, No-Action Alternative

LOS	Signalized Intersections				Stop-Controlled Intersections			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	32 (100%)	30 (94%)	30 (94%)	27 (85%)	11 (73%)	10 (66%)	14 (93%)	10 (66%)
Fair	0 (0%)	1 (3%)	2 (6%)	3 (9%)	1 (7%)	1 (7%)	1 (7%)	4 (27%)
Poor	0 (0%)	1 (3%)	0 (0%)	2 (6%)	3 (20%)	4 (27%)	0 (0%)	1 (7%)

Source: Appendix F.



The I-26 ramp terminal intersections at Cosgrove Avenue and I-26 Eastbound ramp terminal intersection at Montague Avenue are neither signalized nor stop-controlled. The ramp terminal intersections act as merge, diverge or weave elements along Cosgrove Avenue and Montague Avenue. All ten of the elements would operate at Good LOS during both the AM and PM peak hours in the opening year 2018 and design year 2038 No-Action Alternative.

In the opening year 2018, two freeway elements were analyzed on the Port Access Road. The HLT would not be open to traffic in the year 2018, so all eastbound Port Access Road traffic would be destined to the Local Access Road and all westbound Port Access Road traffic would come from the Local Access Road. The two analyzed elements were the eastbound Port Access Road merge from the eastbound and westbound I-26 ramps and the split of the westbound Port Access Road to eastbound and westbound I-26. Both of these elements would operate at Good LOS during both the AM and PM peak hours in the opening year.

In the design year 2038, the analysis also included the on- and off- ramps from the Port Access Road to the Local Access Road. The HLT would be open, and the Port Access Road would serve most of the traffic to and from the facility along with the traffic destined to the Local Access Road. All four freeway elements on the Port Access Road would operate at Good LOS during both the AM and PM peak hours in the design year.

### At-Grade Rail Crossings

Over time, due to an increase in train lengths, it is anticipated that roadways would be blocked for longer periods of times at most at-grade rail crossings. The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase approximately 8 percent from the year 2013 existing conditions to opening year 2018 No-Action Alternative. The daily combined total rail occupancy time would continue to increase, nearly 30 percent, from the year 2018 to year 2038 in the No-Action Alternative. Same as the year 2013 existing conditions, the at-grade rail crossing of Avenue B east of Virginia Avenue would be the only location to operate with a Poor LOS in the opening year 2018 No-Action Alternative. By the design year 2038, three additional at-grade crossing would operate with a Poor LOS. These three additional at-grade locations are North Rhett Avenue south of I-526, Hackemann Avenue between Meeting Street and King Street, and Discher Street between Meeting Street and King Street. In both the opening year 2018 and design year 2038, the at-grade rail crossing of Virginia Avenue north of Empire Avenue would operate LOS D, slightly better than the Poor LOS.

Several at-grade crossings would have substantial queuing during other commodity train occurrences in the opening year 2018 and design year 2038 No-Action Alternative. The queue at two of these locations, Virginia Avenue north of Empire Avenue and North Rhett Avenue south of I-526, would impact the I-526 interstate mainline. The mainline would be impacted by the queue from the

at-grade crossing backing up through the intersection with the off-ramp, which would cause additional queue on the off-ramp that impacts the I-526 mainline.

The opening year 2018 and design year 2038 No-Action Alternative at-grade rail crossing analysis results, which are used to determine impacts for the respective year proposed action alternatives, are shown in Table 4.8-7 and Table 4.8-8, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 No-Action Alternative is shown in Figure 4.8-4.

Table 4.8-7  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for the No-Action Alternative

Map ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Daily Other Commodity Trains		Max Queue (feet)	Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS
			Number of Train Crossings	Average Duration of Crossing (min:sec)				
1	Rivers Avenue (US 78)	31,900	2.2	04:09	2,300	No	7.7	A
2	Attaway Street	4,500	4.9	03:47	600	No	6.3	A
3	North Rhett Avenue	16,300	4.9	07:16	>5,280	Yes	43.9	D
4	Virginia Avenue	8,600	1.1	26:07	3,750	Yes	50.9	D
5	Avenue B	6,900	1.1	34:36	>5,280	No	105.3	F
6	Dorchester Road (SC 642)	16,700	5.3	04:01	1,525	No	10.3	B
7	Accabee Road	3,100	5.3	03:09	225	No	3.9	A
8	Misroon Street	500	5.3	03:09	50	No	6.2	A
9	Hackemann Avenue	1,500	3.1	04:06	2,825	No	23.0	C
10	Discher Street	3,100	5.3	03:09	1,225	No	16.8	B
11	Pittsburgh Avenue	2,000	0.0	00:00	0	No	0.0	A

1. Analyzed at-grade crossing locations are shown in Figure 4.8-4.

Source: Appendix F.

Table 4.8-8  
Design Year 2038 At-Grade Rail Crossings Analysis Results for the No-Action Alternative

Map ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Daily Other Commodity Trains		Max Queue (feet)	Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS
			Number of Train Crossings	Average Duration of Crossing (min:sec)				
1	Rivers Avenue (US 78)	36,400	2.2	05:14	4,525	Yes	11.3	B
2	Attaway Street	6,200	4.9	06:21	1,150	No	18.1	B
3	North Rhett Avenue	24,700	4.9	09:44	>5,280	Yes	100.4	F
4	Virginia Avenue	9,900	1.1	27:10	4,275	Yes	53.4	D
5	Avenue B	8,200	1.1	35:29	>5,280	No	119.7	F

Map ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Daily Other Commodity Trains		Max Queue (feet)	Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS
			Number of Train Crossings	Average Duration of Crossing (min:sec)				
6	Dorchester Road (SC 642)	17,400	5.3	05:13	1,925	No	18.6	B
7	Accabee Road	3,100	5.3	05:13	350	No	8.7	A
8	Misroon Street	500	5.3	04:13	50	No	9.3	A
9	Hackemann Avenue	1,500	3.1	05:29	5,050	No	59.3	E
10	Discher Street	3,200	5.3	04:12	3,200	No	59.0	E
11	Pittsburgh Avenue	2,100	0.0	00:00	0	No	0.0	A

1. Analyzed at-grade crossing locations are shown in Figure 4.8-4.

Source: Appendix F.

### 4.8.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via S-line)

The following sections describe the transportation impacts associated with the Proposed Project, which is described in detail in Section 1.7 and shown in Figures 1.7-1 through 1.7-8. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. The Proposed Project impacts are summarized in Section 4.8.10.

As mentioned in Section 1.7.1.2.3, the Proposed Project creates a new at-grade rail crossing at the intersection of Meeting Street (US 52) and Herbert Street. This analyzed at-grade rail crossing network is identified by ID 12 in tables 4.8-18 and 4.8-19.

The distribution of truck traffic between the ICTF and the four container terminals along with other regional sites would change from the opening year 2018 to the design year 2038. In the opening year 2018, the Wando Welch and North Charleston port facilities would handle a higher percentage of the containers because the HLT would not be open. Additionally, the other regional sites, which include local distribution centers and routes out of the region such as I-26 and US 17, would increase from approximately 10% to 15%. The year 2018 and 2038 distribution of the ICTF truck traffic is shown in Exhibit 4.8-1.



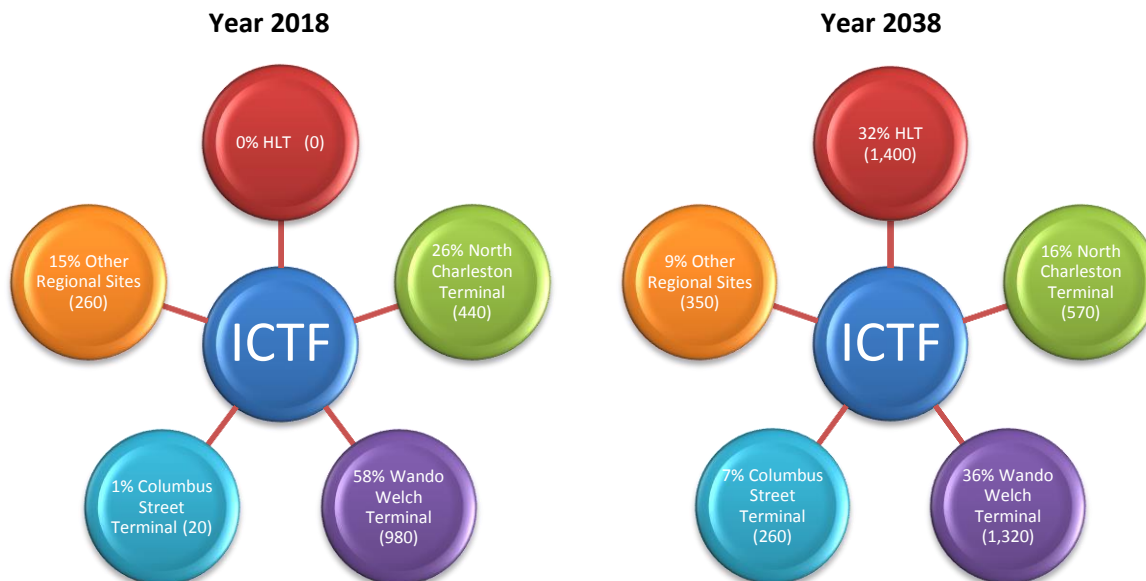


Exhibit 4.8-1: Build Proposed Project ICTF Truck Distributions

Source: Appendix F.

Traffic patterns around the ICTF change compared to the No-Action Alternative due to the ICTF and modifications to the roadway network. In its opening year 2018, the ICTF would handle 1,100 trucks per day and 500 employee and visitor vehicles per day with access via North Hobson Avenue. By the design year 2038, the ICTF would handle 3,900 trucks and 1,100 employee and visitor vehicles per day. Of the 3,900 trucks per day, 1,400 would be on the drayage road between the ICTF and the HLT, effectively removing 1,400 trucks from public roadways. In the No-Action Alternative, the 1,400 truck trips would be on public roadways. Roadway modifications including the Cosgrove Avenue / McMillan Avenue realignment and overpass and the removal of Viaduct Road between Spruill Avenue and North Hobson Avenue lead to increased volumes on Noisette Boulevard, Cosgrove Avenue and the Local Access Road compared to the No-Action Alternative. The opening year 2018 and design year 2038 Proposed Project daily volumes are shown in Appendix P.

#### 4.8.3.1 Construction

During construction of the ICTF and associated roadway improvements, Alternative 1 (Proposed Project) would have a negligible impact on I-26, I-526 and US 17 and a minor adverse impact on North Charleston intersections. It is anticipated that at the peak of construction up to 200 trips per day would be generated. The construction traffic would primarily use major arterial roadways such as I-26, I-526, Cosgrove Avenue, McMillan Avenue, Viaduct Road, North Hobson Avenue, Rivers Avenue and Spruill Avenue. The 200 construction trips per day would only be a small fraction of the daily volumes on these roadways, especially the interstates. A maintenance of traffic (MOT) plan has not been developed but may include detours and temporary lane closures.

### 4.8.3.2 Operations

#### Interstate 26

Consistent with the opening year 2018 No-Action Alternative, the morning congestion on I-26 occurs in the eastbound direction, and the evening congestion occurs in the westbound direction for the Build Proposed Project Alternative. Approximately 13 percent of the total analyzed segments (AM and PM peak hours for eastbound and westbound I-26) would operate at Poor LOS and 25 percent would operate at Fair LOS. By the design year 2038, approximately 21 percent of the total analyzed segments would operate at Poor LOS and 24 percent would operate at Fair LOS. A summary of the I-26 freeway segment LOS by direction and peak hour is shown in Table 4.8-9.

Table 4.8-9  
I-26 Operations, Alternative 1 (Proposed Project)

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	15 Segments (36%)	12 Segments (29%)	36 Segments (86%)	30 Segments (71%)	35 Segments (92%)	34 Segments (90%)	11 Segments (29%)	14 Segments (37%)
Fair	17 Segments (40%)	11 Segments (26%)	4 Segments (9%)	10 Segments (24%)	1 Segment (3%)	2 Segments (5%)	16 Segments (42%)	18 Segments (47%)
Poor	10 Segments (24%)	19 Segments (45%)	2 Segments (5%)	2 Segments (5%)	2 Segments (5%)	2 Segments (5%)	11 Segments (29%)	6 Segments (16%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-26.

Source: Appendix F.

In the opening year 2018 and design year 2038, Alternative 1 (Proposed Project) would have a negligible impact on the majority of the I-26 corridor in comparison with the No-Action Alternative. Alternative 1 (Proposed Project) would have a beneficial or adverse impact on a few segments due to a LOS change. The LOS change is a result of the segments having a density near a LOS threshold. All segments would only have a slight increase or decrease in density. A summary of the opening year 2018 and design year 2038 I-26 freeway impacts by direction and peak hour is shown in Table 4.8-10.

Table 4.8-10  
I-26 Freeway Segment Impacts for Alternative 1 (Proposed Project)

Impact		Eastbound				Westbound			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038	2018	2038	2018	2038
Beneficial	Major	0	0	0	0	0	0	0	0
	Moderate	1	2	0	0	0	0	0	1
	Minor	3	1	0	1	0	5	2	1
Negligible		35	38	41	40	38	32	35	36
Adverse	Minor	1	0	1	1	0	1	1	0
	Moderate	2	1	0	0	0	0	0	0
	Major	0	0	0	0	0	0	0	0

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-26.

Source: Appendix F.

## Interstate 526

Similar to the opening year 2018 No-Action Alternative, the majority of the congestion along I-526 would occur between Paul Cantrell Boulevard and Long Point Road. Approximately 25 percent of the total analyzed segments (AM and PM peak hours for eastbound and westbound I-526) would operate at Poor LOS and 39 percent would operate at Fair LOS. By the design year 2038, approximately 32 percent of the total analyzed segments would operate at Poor LOS and 37 percent would operate at Fair LOS. A summary of the I-526 freeway segment LOS by direction and peak hour is shown in Table 4.8-11.



Table 4.8-11  
I-526 Operations, Alternative 1 (Proposed Project)

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	18 Segments (40%)	14 Segments (31%)	13 Segments (29%)	13 Segments (29%)	15 Segments (34%)	12 Segments (28%)	18 Segments (42%)	15 Segments (35%)
Fair	15 Segments (33%)	14 Segments (31%)	23 Segments (51%)	19 Segments (42%)	14 Segments (33%)	15 Segments (35%)	17 Segments (39%)	18 Segments (42%)
Poor	12 Segments (27%)	17 Segments (38%)	9 Segments (20%)	13 Segments (29%)	14 Segments (33%)	16 Segments (37%)	8 Segments (19%)	10 Segments (23%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-526.

Source: Appendix F.

In the opening year 2018 and design year 2038, Alternative 1 (Proposed Project) would have a negligible impact on the majority of the I-526 corridor in comparison with the No-Action Alternative. Alternative 1 (Proposed Project) would have a beneficial or adverse impact on a few segments due to a LOS change. The LOS change is a result of the segments having a density near a LOS threshold. All segments would only have a slight increase or decrease in density. A summary of the opening year 2018 and design year 2038 I-526 freeway impacts by direction and peak hour is shown in Table 4.8-12.

Table 4.8-12  
I-526 Freeway Segment Impacts for Alternative 1 (Proposed Project)

Impact		Eastbound				Westbound			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038	2018	2038	2018	2038
Beneficial	Major	1	0	0	2	0	0	0	0
	Moderate	0	0	1	1	0	0	0	0
	Minor	1	0	0	0	0	0	0	0
Negligible		42	44	44	40	39	40	42	41
Adverse	Minor	0	1	0	1	2	3	1	1
	Moderate	1	0	0	1	1	0	0	1
	Major	0	0	0	0	1	0	0	0

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-526.

Source: Appendix F.

## U.S. Highway 17

Similar to the opening year 2018 No-Action Alternative, the majority of the US 17 corridor would operate at a Good or Fair levels for Alternative 1 (Proposed Project). Only one freeway segment and one intersection would operate at Poor LOS in either the AM or PM peak hour. By the design year 2038, one additional freeway segment and two additional intersections would operate at Poor LOS in either the AM or PM peak hour. A summary of the US 17 freeway segment LOS by direction and peak hour is shown in Table 4.8-13. A summary of the US 17 signalized intersection operations is shown in Table 4.8-14.

Table 4.8-13  
US 17 Freeway Operations, Alternative 1 (Proposed Project)

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	9 Segments (90%)	9 Segments (90%)	7 Segments (70%)	5 Segments (50%)	10 Segments (91%)	8 Segments (73%)	11 Segments (100%)	10 Segments (91%)
Fair	1 Segment (10%)	1 Segment (10%)	2 Segments (20%)	3 Segments (30%)	1 Segment (9%)	3 Segments (27%)	0 Segments (0%)	1 Segment (9%)
Poor	0 Segments (0%)	0 Segments (0%)	1 Segment (10%)	2 Segments (20%)	0 Segments (0%)	0 Segments (0%)	0 Segments (0%)	0 Segments (0%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between northbound and southbound US 17.

Source: Appendix F.

Table 4.8-14  
US 17 Intersection Operations, Alternative 1 (Proposed Project)

LOS	AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038
Good	3 Intersections (60%)	2 Intersections (40%)	2 Intersections (40%)	2 Intersections (40%)
Fair	1 Intersection (20%)	2 Intersections (40%)	3 Intersections (60%)	1 Intersection (20%)
Poor	1 Intersection (20%)	1 Intersection (20%)	0 Intersections (0%)	2 Intersections (40%)

Source: Appendix F.

In the opening year 2018, Alternative 1 (Proposed Project) would have a negligible impact on the majority of the US 17 corridor in comparison with the No-Action Alternative, including all five of the signalized intersections. Alternative 1 (Proposed Project) would not have a beneficial impact on any of the US 17 segments in either the AM or PM peak hour. Alternatively, Alternative 1 (Proposed

Project) would have an adverse impact on three of the US 17 segments (7 percent of the total segments) in either the AM or PM peak hour, all of which are categorized as minor. In the design year 2038, Alternative 1 (Proposed Project) would have a negligible impact on all of the analyzed US 17 freeway segments and intersections. A summary of the opening year 2018 and design year 2038 US 17 freeway impacts by direction and peak hour is shown in Table 4.8-15. A table of impacts is not shown for the US 17 intersections because all intersections have a negligible impact in both opening year 2018 and design year 2038.

Table 4.8-15  
US 17 Freeway Segment Impacts for Alternative 1 (Proposed Project)

Impact		Northbound				Southbound			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038	2018	2038	2018	2038
Beneficial	Major	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0
	Minor	0	0	0	0	0	0	0	0
Negligible		8	10	9	10	11	11	11	11
Adverse	Minor	2	0	1	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0
	Major	0	0	0	0	0	0	0	0

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between northbound and southbound US 17.

Source: Appendix F.

### North Charleston Intersections

Alternative 1 (Proposed Project) included the analysis of 32 signalized intersections and 14 stop-controlled intersections within North Charleston. The ICTF employee and visitor driveway and truck driveway created two new stop-controlled intersections along North Hobson Avenue. As part of the project, McMillan Avenue is realigned and grade separated from the new ICTF railroad tracks, which eliminated the stop-controlled intersection of St. Johns Avenue at McMillan Avenue. The stop-controlled McMillan Avenue at North Hobson Avenue intersection would become signalized as part of Alternative 1 (Proposed Project). Additionally, the removal of Viaduct Road eliminates two stop-controlled intersections, which are at the ramps connecting Viaduct Road and Bainbridge Avenue. The existing stop-controlled Viaduct Road intersection at North Hobson Avenue and South Hobson Avenue is replaced with a stop-controlled intersection where the Local Access Road, North Hobson Avenue and South Hobson Avenue meet. Finally, Bainbridge Avenue would be slightly realigned and "T" into the Local Access Road as a stop-controlled intersection.



The worst of the AM and PM peak hour intersection LOS for the Alternative 1 (Proposed Project) opening year 2018 and design year 2038 are shown in Figure 4.8-5 and Figure 4.8-6, respectively. A summary of the North Charleston intersection operations is shown in Table 4.8-16.

Consistent with the opening year 2018 No-Action Alternative, within North Charleston, the majority of the analyzed intersections operate with little delay. The stop-controlled intersections of Avenue B at Virginia Avenue, the I-526 Eastbound Off-Ramp at Virginia Avenue, and Bainbridge Avenue at the Local Access Road are the only intersections that would operate with a Poor LOS in the opening year 2018.

By the design year 2038, a few additional intersections would operate with Poor LOS but the majority of the intersections would still operate with little delay. The signalized intersections of Cosgrove Avenue at Spruill Avenue and Cosgrove Avenue at Azalea Drive and the stop-controlled intersections of Avenue B at Virginia Avenue, the I-526 Eastbound Off-Ramp at Virginia Avenue, Turnbull Avenue at Noisette Boulevard, Noisette Boulevard at McMillan Avenue, and Bainbridge Avenue at the Local Access Road are the only intersections that would operate with a Poor LOS in the design year 2038.

Table 4.8-16  
North Charleston Intersection Operations, Alternative 1 (Proposed Project)

LOS	Signalized Intersections				Stop-Controlled Intersections			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	30 (94%)	30 (94%)	29 (91%)	28 (88%)	10 (72%)	9 (64%)	11 (79%)	11 (79%)
Fair	2 (6%)	1 (3%)	3 (9%)	2 (6%)	1 (7%)	0 (0%)	2 (14%)	0 (0%)
Poor	0 (0%)	1 (3%)	0 (0%)	2 (6%)	3 (21%)	5 (36%)	1 (7%)	3 (21%)

Source: Appendix F.

A summary of the opening year 2018 and design year 2038 Alternative 1 (Proposed Project) North Charleston intersection impacts by peak hour is shown in Table 4.8-17. Two intersections, the ICTF truck driveway at North Hobson Avenue and ICTF employee and visitor driveway at North Hobson Avenue, did not exist in the No-Action Alternative so were only analyzed in Alternative 1 (Proposed Project). An impact cannot be defined for these intersections because they were not analyzed in the No-Action Alternative. However, both intersections are projected to operate at Good LOS in the opening year 2018 and design year 2038 Alternative 1 (Proposed Project) for both the AM and PM peak hours.

In the opening year 2018, Alternative 1 (Proposed Project) would have a negligible impact on the majority of the analyzed intersections in North Charleston compared with the No-Action Alternative. Alternative 1 (Proposed Project) would have a beneficial impact on six intersections (7 percent of the total intersections) in either the AM or PM peak hour. Five of the six intersections would have a minor

beneficial impact, which equates to an improvement of one LOS grade. The North Hobson Avenue at McMillan Avenue intersection would have a moderate beneficial impact in the PM peak hour because mitigation measures include lane geometry improvements and adding a traffic signal to the intersection. Alternatively, Alternative 1 (Proposed Project) would have an adverse impact on 12 intersections (14 percent of the total intersections) in either the AM or PM peak hour. Five of the 12 intersections would have a minor adverse impact, which equates to a degradation of one LOS grade. Moderate adverse impacts would occur at the signalized Spruill Avenue at McMillan Avenue/ Cosgrove Avenue Realignment intersection in both the AM and PM peak hours and the stop-controlled intersections South Hobson Avenue at the Local Access Road/ North Hobson Avenue in the AM peak hour and Turnbull Avenue at Noisette Boulevard in the PM peak hour.

The stop-controlled Avenue B at Virginia Avenue intersection would have a major adverse impact in the AM peak hour as the LOS degrades from LOS E to LOS F. The traffic volume at the intersection is projected to increase as Avenue B and Noisette Boulevard would potentially serve as part of a route between the ICTF and I-526 for employees. Trucks would not use this route as they are restricted on Noisette Boulevard. Additionally, traffic patterns in the area would shift due to roadway modifications such as the connection of St. Johns Avenue with McMillan Avenue being severed. The stop-controlled left-turn movement that would operate at LOS F is a low volume movement, less than 20 vehicles in the AM peak hour.

The other location that would have an adverse major impact due to degradation of LOS, from LOS B to LOS F in both the AM and PM peak hours, is the stop-controlled Bainbridge Avenue at the Local Access Road intersection. The intersection would be modified from a four-leg signalized intersection in the No-Action Alternative to a three-leg stop-controlled intersection in Alternative 1 (Proposed Project). Daily volumes on the Local Access Road would increase in Alternative 1 (Proposed Project) compared to the No-Action Alternative because of the removal of the Viaduct Road overpass and trucks trips between the Navy Base ICTF and I-26.

In the design year 2038, similar to the opening year 2018, Alternative 1 (Proposed Project) would have a negligible impact on the majority of the analyzed intersections in North Charleston compared with the No-Action Alternative. Alternative 1 (Proposed Project) would have a beneficial impact on seven intersections (8 percent of the total intersections) in either the AM or PM peak hour. Four of the seven intersections would have a minor beneficial impact, which equates to an improvement of one LOS grade. A moderate beneficial impact would be experienced by the signalized intersections of Spruill Avenue at McMillan Avenue in the AM peak hour and Rivers Avenue at Cosgrove Avenue and North Hobson Avenue at McMillan Avenue in the PM peak hour. However, the Rivers Avenue at Cosgrove Avenue intersection would only see a slight improvement in delay. It is not a minor impact despite only improving one LOS grade because the intersection is just above the LOS E threshold in the No-Action Alternative, while just below in Alternative 1 (Proposed Project). Alternative 1 (Proposed Project) would remove McMillan Avenue from St. Johns Avenue to Kephart Street, which

would improve the Spruill Avenue at McMillan Avenue intersection operations by reducing the volumes on McMillan Avenue. The North Hobson Avenue at McMillan Avenue intersection would have a moderate beneficial impact in the PM peak hour because mitigation measures include lane geometry improvements and adding a traffic signal to the intersection.

Alternatively, Alternative 1 (Proposed Project) would have an adverse impact on eleven intersections (13 percent of the total intersections) in either the AM or PM peak hour. Three of the 11 intersections would have a minor adverse impact, which equates to a degradation of one LOS grade. The four-way stop-controlled Noisette Boulevard at Turnbull Avenue intersection and the stop-controlled intersection of South Hobson Avenue at the Local Access Road/ North Hobson Avenue would have an adverse moderate impact in both the AM and PM peak hours.

The signalized intersection of Spruill Avenue at McMillan Avenue/ Cosgrove Avenue Realignment would have a major adverse impact. Alternative 1 (Proposed Project) would degrade the LOS at this intersection due to higher volumes on Cosgrove Avenue as a result of the proposed ICTF and McMillan Avenue/ Cosgrove Avenue Realignment.

The other location that would have an adverse major impact due to degradation of LOS, from LOS B to LOS F in both the AM and PM peak hours, is the stop-controlled Bainbridge Avenue at the Local Access Road intersection. The intersection would be modified from a four-leg signalized intersection in the No-Action Alternative to a three-leg stop-controlled intersection in Alternative 1 (Proposed Project). Daily volumes on the Local Access Road would increase in Alternative 1 (Proposed Project) compared to the No-Action Alternative because of the removal of the Viaduct Road overpass and trucks trips between the Navy Base ICTF and I-26.

The I-26 ramp terminal intersections at Cosgrove Avenue and I-26 Eastbound ramp terminal intersection at Montague Avenue are neither signalized nor stop-controlled. The ramp terminal intersections act as merge, diverge or weave elements along Cosgrove Avenue and Montague Avenue. All ten of the elements would operate at Good LOS during both the AM and PM peak hours in the opening year 2018 and design year 2038 Alternative 1 (Proposed Project).



Table 4.8-17  
North Charleston Intersection Impacts for Alternative 1 (Proposed Project)

Impact		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038
Beneficial	Major	0	0	0	0
	Moderate	0	1	1	2
	Minor	3	1	2	3
Negligible		35	37	35	33
Adverse	Minor	2	1	3	2
	Moderate	2	2	2	2
	Major	2	2	1	2

Source: Appendix F.

In the opening year 2018, two freeway elements were analyzed on the Port Access Road. The HLT would not be open to traffic in the year 2018, so all eastbound Port Access Road traffic would be destined to the Local Access Road and all westbound Port Access Road traffic would come from the Local Access Road. The two analyzed elements were the eastbound Port Access Road merge from the eastbound and westbound I-26 ramps and the split of the westbound Port Access Road to eastbound and westbound I-26. Same as the No-Action Alternative, both of these elements would operate at Good LOS during both the AM and PM peak hours in the opening year.

In the design year 2038, the analysis also included the on- and off- ramps from the Port Access Road to the Local Access Road. The HLT would be open, and the Port Access Road would serve most of the traffic to and from the facility along with the traffic destined to the Local Access Road. Same as the No-Action Alternative, all four freeway elements on the Port Access Road would operate at Good LOS during both the AM and PM peak hours in the design year.

### At-Grade Rail Crossings

The opening year 2018 and design year 2038 Alternative 1 (Proposed Project) at-grade rail crossing analysis results are shown in Table 4.8-18 and Table 4.8-19, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 1 (Proposed Project) is shown in Figure 4.8-7.

Compared with the No-Action Alternative, Alternative 1 (Proposed Project) would reroute approximately 1.2 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 1 (Proposed Project) would have on the at-grade crossings along the Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

Alternative 1 (Proposed Project) would have an impact on several of the at-grade rail crossings in North Charleston due to changing train and vehicular volumes and routes. The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase nearly 120 percent from the opening year 2018 No-Action Alternative to Alternative 1 (Proposed Project). In the design year 2038, the daily combined total rail occupancy time would increase over 180 percent.

In the opening year 2018, three at-grade crossings would operate with a Poor LOS. These three locations are the at-grade crossings of Virginia Avenue north of Empire Avenue, Avenue B east of Virginia Avenue, and Discher Street between Meeting Street and King Street. Only the at-grade rail crossing of Discher Street would have a major adverse impact as the LOS would degrade from LOS B in the No-Action Alternative to LOS E in Alternative 1 (Proposed Project). The at-grade rail crossing of Avenue B would have a negligible impact because it would operate with a LOS F in both the No-Action Alternative and Alternative 1 (Proposed Project) and the average vehicle delay would increase less than 10 percent. The at-grade rail crossing of Virginia Avenue would have a moderate adverse impact as the LOS would degrade from a LOS D in the No-Action Alternative to a LOS E in Alternative 1 (Proposed Project). None of the at-grade rail crossings would create a queue from an ICTF train occurrence that impacts an interstate mainline in the opening year 2018.

By the design year 2038, the average ICTF train crossing duration time would approximately double from the opening year 2018 value. The longer ICTF train crossing durations, as well as higher roadway volumes and longer other commodity train crossing durations, would lead to seven of the 12 at-grade crossing locations operating with a Poor LOS and nine of the twelve analyzed at-grade rail crossings having a major adverse impact in the design year 2038. Additionally, the at-grade rail crossings of Rivers Avenue north of Taylor Street, North Rhett Avenue south of I-526, and Dorchester Road west of Meeting Street would create a queue from an ICTF train occurrence that impacts an interstate mainline in the design year 2038. However, in the No-Action Alternative, only the Dorchester Road at-grade crossing would not impact an interstate mainline.

Table 4.8-18  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 1 (Proposed Project)

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,800	2.2	4.0	04:07	05:34	2,850	No	19.7	B	Minor	A
2	Attaway Street	4,500	3.7	4.0	03:47	05:38	800	No	14.5	B	Minor	A
3	North Rhett Avenue	16,200	3.7	4.0	07:16	05:38	>5,280	No	47.4	D	Negligible	D
4	Virginia Avenue	9,100	1.1	4.0	26:09	05:42	900	No	59.8	E	Moderate	D
5	Avenue B	8,700	1.1	4.0	34:34	05:40	2,550	No	113.7	F	Negligible	F
6	Dorchester Road (SC 642)	17,400	5.3	4.0	03:57	05:33	1,975	No	21.9	C	Minor	B
7	Accabee Road	3,100	5.3	4.0	03:10	05:32	450	No	14.4	B	Minor	A
8	Misroon Street	500	5.3	4.0	03:10	05:32	75	No	13.5	B	Minor	A
9	Hackemann Avenue	1,500	3.1	4.0	04:06	05:32	3,575	No	54.5	D	Minor	C
10	Discher Street	3,100	5.3	4.0	03:09	05:31	3,500	No	61.4	E	Major	B
11	Pittsburgh Avenue	2,000	0.0	4.0	00:00	05:32	400	No	9.4	A	Negligible	A
12	Meeting Street & Herbert Street	16,400 & 900	0.0	4.0	00:00	05:32	2,425	No	8.2	A	Negligible	--

1. Analyzed at-grade crossing locations are shown in Figure 4.8-7.

Source: Appendix F.



Table 4.8-19  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 1 (Proposed Project)

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,000	2.1	4.0	05:13	10:52	>5,280	Yes	65.9	E	Major	B
2	Attaway Street	6,200	3.7	4.0	06:21	10:52	2,150	No	49.5	D	Moderate	B
3	North Rhett Avenue	24,200	3.7	4.0	09:44	10:52	>5,280	Yes	170.0	F	<sup>2</sup> Negligible	F
4	Virginia Avenue	10,400	1.1	4.0	27:22	10:51	2,075	No	81.3	F	Major	D
5	Avenue B	9,800	1.1	4.0	35:38	10:50	>5,280	No	152.3	F	<sup>2</sup> Negligible	F
6	Dorchester Road (SC 642)	18,400	5.2	4.0	05:05	11:34	5,000	Yes	84.3	F	Major	B
7	Accabee Road	3,100	5.2	4.0	05:05	11:34	875	No	33.4	C	Moderate	A
8	Misroon Street	500	5.2	4.0	04:13	11:31	125	No	42.6	D	Major	A
9	Hackemann Avenue	1,500	3.1	4.0	05:29	11:31	>5,280	No	362.9	F	Major	E
10	Discher Street	3,200	5.2	4.0	04:12	10:46	>5,280	No	291.2	F	Major	E
11	Pittsburgh Avenue	2,100	0.0	4.0	00:00	10:46	800	No	39.3	D	Major	A
12	Meeting Street & Herbert Street	21,600 & 2,800	0.0	4.0	00:00	10:46	>5,280	No	32.6	C	Moderate	--

1. Analyzed at-grade crossing locations are shown in Figure 4.8-7.

2. Although the relative impact as compared to the No-Action is negligible the average delay per vehicle increased >20%.

Source: Appendix F.

#### 4.8.4 Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)

The following sections describe the transportation impacts associated with Alternative 2, which is described in detail in Section 2.4.3 and shown in Figure 2.4-1. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. Alternative 2 impacts are summarized in Section 4.8.10.

Alternative 2 would be a variation of the Proposed Project where the northern rail connection for NS would be relocated along Spruill Avenue within existing CSX ROW to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line. As a result of the rail alignment, a cul-de-sac would be constructed at the southern end of St. Johns Avenue. The former Charleston Naval Complex gate at Turnbull Avenue will be reopened to provide future access between St. Johns Avenue and Noisette Boulevard. Due to these roadway changes, the Alternative 2 daily volumes on Spruill Avenue, Noisette Boulevard, St. Johns Avenue, Turnbull Avenue and the proposed Cosgrove Avenue/McMillan Avenue Bypass would differ from Alternative 1 (Proposed Project). The opening year 2018 and design year 2038 Alternative 2 daily volumes are shown in Appendix P.

Same as Alternative 1 (Proposed Project), Alternative 2 creates a new at-grade rail crossing at the intersection of Meeting Street (US 52) and Herbert Street. This analyzed at-grade rail crossing is identified by ID 12 in the tables. Additionally, Alternative 2 creates a new at-grade rail crossing of O-Hear Avenue south of Bexley Street, which is identified by ID 13 in the tables.

#### Construction, Interstate 26, Interstate 526 and U.S. Highway 17

Alternative 2 would have the same operations and impacts during construction, opening year 2018 and design year 2038 to I-26, I-526 and US 17 as Alternative 1 (Proposed Project), which is described in Section 4.8.3.

#### North Charleston Intersections

Alternative 2 included the analysis of 32 signalized intersections and 15 stop-controlled intersections within North Charleston. All of the same intersections analyzed for Alternative 1 (Proposed Project) were analyzed for Alternative 2 plus the stop-controlled Turnbull Avenue at St. Johns Avenue. The intersection operations and impacts described for Alternative 1 (Proposed Project) in Section 4.8.3 would be the same for Alternative 2 except for five intersections. The signalized intersections of Spruill Avenue at McMillan Avenue and Spruill Avenue at Cosgrove Avenue and the stop-controlled intersections of Noisette Boulevard at Turnbull Avenue, Noisette Boulevard at McMillan Avenue/Cosgrove Avenue Realignment, and Turnbull Avenue at St. Johns Avenue would differ.

The worst of the AM and PM peak hour intersection LOS for the Alternative 2 opening year 2018 and design year 2038 are shown in Figure 4.8-8 and Figure 4.8-9, respectively. A summary of the North Charleston Alternative 2 intersection operations is shown in Table 4.8-20. A summary of the opening year 2018 and design year 2038 Alternative 2 North Charleston intersection impacts by peak hour is shown in Table 4.8-21.

The new stop-controlled intersection of Turnbull Avenue at St. Johns Avenue would operate at LOS A in opening year 2018 and design year 2038 AM and PM peak hours. An impact cannot be defined for the intersection because it did not exist in the No-Action Alternative.

Spruill Avenue at Cosgrove Avenue would operate with the same LOS in both Alternatives, so there would be no change in impacts at this intersection.

Spruill Avenue at McMillan Avenue would improve one LOS grade to LOS A in the opening year 2018 PM peak hour. Alternative 1 (Proposed Project) would have a negligible impact on this intersection while Alternative 2 would have a minor beneficial impact. In the design year 2038 AM peak hour, the intersection would degrade one LOS grade to LOS D. However, Alternative 1 (Proposed Project) and Alternative 2 would both have a moderate beneficial impact because the No-Action Alternative would operate at LOS E.

Noisette Boulevard at Turnbull Avenue would improve one LOS grade to LOS C in the opening year 2018 PM peak hour. Alternative 1 (Proposed Project) would have a moderate adverse impact on this intersection while Alternative 2 would have a minor adverse impact.

Noisette Boulevard at McMillan Avenue/ Cosgrove Avenue Realignment would degrade two LOS grades to LOS F in the opening year 2018 AM peak hour and one LOS grade to LOS E in the PM peak hour. Alternative 1 (Proposed Project) would have a negligible impact on this intersection in both the opening year 2018 AM and PM hours. Alternative 2 would have a major adverse impact in the AM peak hour and moderate adverse impact in the PM peak hour. The cul-de-sac of St. Johns Avenue and opening of the gates on Turnbull Avenue would lead to higher volumes at the intersection.

Table 4.8-20  
North Charleston Intersection Operations, Alternative 2

LOS	Signalized Intersections				Stop-Controlled Intersections			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	30 (94%)	29 (91%)	29 (91%)	28 (88%)	11 (73%)	10 (67%)	13 (87%)	12 (80%)
Fair	2 (6%)	2 (6%)	3 (9%)	2 (6%)	0 (7%)	0 (0%)	0 (0%)	0 (0%)
Poor	0 (0%)	1 (3%)	0 (0%)	2 (6%)	4 (27%)	5 (33%)	2 (13%)	3 (20%)

Source: Appendix F.



Table 4.8-21  
North Charleston Intersection Impacts for Alternative 2

Impact		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038
Beneficial	Major	0	0	0	0
	Moderate	0	1	1	2
	Minor	3	1	3	3
Negligible		34	37	33	33
Adverse	Minor	2	1	4	2
	Moderate	2	2	2	2
	Major	3	2	1	2

Source: Appendix F.

The I-26 ramp terminal intersections at Cosgrove Avenue and I-26 Eastbound ramp terminal intersection at Montague Avenue, along with the Port Access Road freeway elements would operate the same and have the same impacts as Alternative 1 (Proposed Project).

### At-Grade Rail Crossings

Alternative 2 would have the same operations and impacts to the nine of the 11 at-grade rail crossings analyzed in Alternative 1 (Proposed Project). The at-grade rail crossing of Attaway Street south of Greenbay Drive and North Rhett Avenue south of I-526 would differ in Alternative 2. The at-grade rail crossings of Attaway Street and North Rhett Avenue would differ in Alternative 2 because it reroutes approximately 0.4 more other commodity trains per day from the Reads Branch line than Alternative 1 (Proposed Project). Compared with the No-Action Alternative, Alternative 2 would reroute approximately 1.6 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 2 would have on the at-grade crossings along the Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

Additionally, because the northern rail connection for NS would be relocated to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line, an additional at-grade rail crossing would be created at O'Hear Avenue south of Bexley Street. The at-grade crossing of O'Hear Avenue would operate at LOS A in the opening year 2018 and LOS C in the design year 2038. The opening year 2018 and design year 2038 Alternative 2 at-grade rail crossing analysis results are shown in Table 4.8-22 and Table 4.8-23, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 2 is shown in Figure 4.8-10.

The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase

approximately 125 percent from the opening year 2018 No-Action Alternative to Alternative 2. In the design year 2038, the daily combined total rail occupancy time would increase nearly 200 percent.

Table 4.8-22  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 2

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,800	2.2	4.0	04:07	05:34	2,850	No	19.7	B	Minor	A
2	Attaway Street	4,500	3.3	4.0	03:47	05:38	800	No	14.0	B	Minor	A
3	North Rhett Avenue	16,200	3.3	4.0	07:16	05:38	>5,280	No	45.8	D	Negligible	D
4	Virginia Avenue	9,100	1.1	4.0	26:09	05:42	900	No	59.7	E	Moderate	D
5	Avenue B	8,700	1.1	4.0	34:34	05:40	2,550	No	113.6	F	Negligible	F
6	Dorchester Road (SC 642)	17,400	5.3	4.0	03:57	05:33	1,975	No	21.9	C	Minor	B
7	Accabee Road	3,100	5.3	4.0	03:10	05:32	450	No	14.4	B	Minor	A
8	Misroon Street	500	5.3	4.0	03:10	05:32	75	No	13.5	B	Minor	A
9	Hackemann Avenue	1,500	3.1	4.0	04:06	05:32	3,575	No	54.5	D	Minor	C
10	Discher Street	3,100	5.3	4.0	03:09	05:31	3,500	No	61.4	E	Major	B
11	Pittsburgh Avenue	2,000	0.0	4.0	00:00	05:32	400	No	9.4	A	Negligible	A
12	Meeting Street & Herbert Street	16,400 & 900	0.0	4.0	00:00	05:32	2,425	No	8.2	A	Negligible	--
13	O'Hear Avenue	1,700	0.0	4.0	00:00	05:32	225	No	6.4	A	Negligible	--

1. Analyzed at-grade crossing locations are shown in Figure 4.8-10.

Source: Appendix F.

Table 4.8-23  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 2

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,000	2.2	4.0	05:13	10:52	>5,280	Yes	66.1	E	Major	B
2	Attaway Street	6,200	3.3	4.0	06:21	10:52	2,150	No	48.5	D	Moderate	B
3	North Rhett Avenue	24,200	3.3	4.0	09:44	10:52	>5,280	Yes	166.0	F	<sup>2</sup> Negligible	F
4	Virginia Avenue	10,400	1.1	4.0	27:22	10:51	2,075	No	82.3	F	Major	D
5	Avenue B	9,800	1.1	4.0	35:38	10:50	>5,280	No	154.5	F	<sup>2</sup> Negligible	F
6	Dorchester Road (SC 642)	18,400	5.3	4.0	05:05	11:34	5,000	Yes	84.5	F	Major	B
7	Accabee Road	3,100	5.3	4.0	05:05	11:34	875	No	33.3	C	Moderate	A
8	Misroon Street	500	5.3	4.0	04:13	11:31	125	No	42.7	D	Major	A
9	Hackemann Avenue	1,500	3.1	4.0	05:29	11:31	>5,280	No	363.2	F	Major	E
10	Discher Street	3,200	5.3	4.0	04:12	10:46	>5,280	No	291.3	F	Major	E
11	Pittsburgh Avenue	2,100	0.0	4.0	00:00	10:46	800	No	39.3	D	Major	A
12	Meeting Street & Herbert Street	21,600 & 2,800	0.0	4.0	00:00	10:46	>5,280	No	32.6	C	Moderate	-
13	O'Hear Avenue	1,900	0.0	4.0	00:00	10:49	425	No	20.2	C	Moderate	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-10.

2. Although the relative impact as compared to the No-Action is negligible the average delay per vehicle increased >20%.

Source: Appendix F.



#### 4.8.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

The following sections describe the transportation impacts associated with Alternative 3, which is described in detail in Section 2.4.4. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. Alternative 3 impacts are summarized in Section 4.8.10.

Alternative 3 would be a variation of the Proposed Project where the southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW). The daily volumes for Alternative 3 would be the same as Alternative 1 (Proposed Project), which are shown in Appendix F.

##### Construction, Interstate 26, Interstate 526, U.S. Highway 17 and North Charleston Intersections

Alternative 3 would have the same operations and impacts during construction, opening year 2018 and design year 2038 to I-26, I-526, US 17 and North Charleston intersections as Alternative 1 (Proposed Project), which is described in Section 4.8.3.

##### At-Grade Rail Crossings

Alternative 3 would have the same operations and impacts to the first nine at-grade rail crossings analyzed in Alternative 1 (Proposed Project). Compared with the No-Action Alternative, same as Alternative 1 (Proposed Project), Alternative 3 would reroute approximately 1.2 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 3 would have on the at-grade crossings along the Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

In Alternative 3 the southern alignment would only go down to around Kingsworth Avenue. Therefore the existing at-grade crossings of Pittsburgh Avenue and Discher Street would not be impacted with ICTF train occurrences and the new at-grade crossing of Meeting Street at Herbert Street would not be created for Alternative 3. Alternative 3 would create two new at-grade crossings. The at-grade crossings would be of Meeting Street and Spruill Avenue near Kingsworth Avenue. Because these two at-grade crossings are located close together and their operations would influence each other, their impacts were identified as one location. The at-grade crossings of Meeting Street and Spruill Avenue would operate at LOS D in both the opening year 2018 and design year 2038. Alternative 3 would have a major adverse impact on these two new at-grade crossings. When there is an ICTF train occurrence, only I-26 and King Street Extension would serve as a connection between North Charleston and Charleston. The opening year 2018 and design year 2038 Alternative 3 at-

Table 4.8-24  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 3

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,800	2.2	4.0	04:07	05:34	2,850	No	19.7	B	Minor	A
2	Attaway Street	4,500	3.7	4.0	03:47	05:38	800	No	14.5	B	Minor	A
3	North Rhett Avenue	16,200	3.7	4.0	07:16	05:38	>5,280	No	47.3	D	Negligible	D
4	Virginia Avenue	9,100	1.1	4.0	26:09	05:42	900	No	59.7	E	Moderate	D
5	Avenue B	8,700	1.1	4.0	34:34	05:40	2,550	No	113.5	F	Negligible	F
6	Dorchester Road (SC 642)	17,400	5.3	4.0	03:57	05:33	1,975	No	21.9	C	Minor	B
7	Accabee Road	3,100	5.3	4.0	03:10	05:32	450	No	14.4	B	Minor	A
8	Misroon Street	500	5.3	4.0	03:10	05:32	75	No	13.5	B	Minor	A
9	Hackemann Avenue	1,500	3.1	4.0	04:06	05:32	3,575	No	54.4	D	Minor	C
10	Discher Street	3,100	5.3	0.0	03:09	00:00	-	-	-	-	-	B
11	Pittsburgh Avenue	2,000	0.0	0.0	00:00	00:00	-	-	-	-	-	A
14	Meeting Street & Spruill Avenue	7,200 & 10,800	0.0	4.0	00:00	05:32	4,775	No	45.8	D	Major	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-11.

Source: Appendix F.

Table 4.8-25  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 3

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,000	2.1	4.0	05:13	10:52	>5,280	Yes	65.9	E	Major	B
2	Attaway Street	6,200	3.7	4.0	06:21	10:52	2,150	No	49.5	D	Moderate	B
3	North Rhett Avenue	24,200	3.7	4.0	09:44	10:52	>5,280	Yes	169.9	F	<sup>2</sup> Negligible	F
4	Virginia Avenue	10,400	1.1	4.0	27:22	10:51	2,075	No	81.0	F	Major	D
5	Avenue B	9,800	1.1	4.0	35:38	10:50	>5,280	No	151.5	F	<sup>2</sup> Negligible	F
6	Dorchester Road (SC 642)	18,400	5.2	4.0	05:05	11:34	5,000	Yes	84.3	F	Major	B
7	Accabee Road	3,100	5.2	4.0	05:05	11:34	875	No	33.4	C	Moderate	A
8	Misroon Street	500	5.2	4.0	04:13	11:31	125	No	42.6	D	Major	A
9	Hackemann Avenue	1,500	3.1	4.0	05:29	11:31	>5,280	No	362.8	F	Major	E
10	Discher Street	3,200	5.3	0.0	04:12	0:00	-	-	-	-	-	E
11	Pittsburgh Avenue	2,100	0.0	0.0	00:00	00:00	-	-	-	-	-	A
14	Meeting Street & Spruill Avenue	10,400 & 13,300	0.0	4.0	00:00	10:45	>5,280	No	52.6	D	Major	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-11.

2. Although the relative impact as compared to the No-Action is negligible the average delay per vehicle increased >20%.

Source: Appendix F.



grade rail crossing analysis results are shown in Table 4.8-24 and Table 4.8-25, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 3 is shown in Figure 4.8-11.

The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase nearly 100 percent from the opening year 2018 No-Action Alternative to Alternative 3. In the design year 2038, the daily combined total rail occupancy time would increase approximately 150 percent.

#### **4.8.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

The following sections describe the transportation impacts associated with Alternative 4, which is described in detail in Section 2.4.5. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. Alternative 4 impacts are summarized in Section 4.8.10.

Alternative 4 would be a variation of the Proposed Project where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection, with NS connecting to an existing NS rail line near Milford Street (and adjacent to existing CSX rail and ROW). Proposed rail through the Hospital District would stop short of Noisette Creek. The daily volumes for Alternative 3 would be the same as Alternative 1 (Proposed Project), which are shown in Appendix F.

#### **Construction, Interstate 26, Interstate 526, U.S. Highway 17 and North Charleston Intersections**

Alternative 4 would have the same operations and impacts during construction, opening year 2018 and design year 2038 to I-26, I-526, US 17 and North Charleston intersections as Alternative 1 (Proposed Project), which is described in Section 4.8.3.

#### **At-Grade Rail Crossings**

In Alternative 4 both CSX and NS would use the southern rail alignment to Milford Street. Since NS would not use the Alternative 1 (Proposed Project) northern alignment, Alternative 4 would not impact the at-grade crossings of Rivers Avenue, Virginia Avenue and Avenue B. The at-grade rail crossings of Attaway Street and North Rhett Avenue would differ compared to the No-Action Alternative because Alternative 4 reroutes approximately 1.6 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 4 would have on the at-grade crossings along the Reads Branch, Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

Alternative 4 would have twice as many ICTF train occurrences than Alternative 1 (Proposed Project), eight per day, at the at-grade crossings along the southern alignment. The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase nearly 135 percent from the opening year 2018 No-Action Alternative to Alternative 4. In the design year 2038, the daily combined total rail occupancy time would increase approximately 215 percent.

Alternative 4 would have an impact on all seven of the analyzed at-grade rail crossings along the southern alignment. In the opening year 2018, two at-grade crossings would operate with a Poor LOS. These two locations are the at-grade crossings of Hackemann Avenue and Discher Street, both of which are located between Meeting Street and King Street. Alternative 4 would have a major adverse impact on both of these crossings as Meeting Street and King Street would experience queueing and delay. None of the at-grade rail crossings would create a queue from an ICTF train occurrence that impacts an interstate mainline in the opening year 2018.

By the design year 2038, the average ICTF train crossing duration time would approximately double from the opening year 2018 value. The longer ICTF train crossing durations, as well as higher roadway volumes and longer other commodity train crossing durations, would lead to all seven of the at-grade crossing locations along the southern alignment operating with a Poor LOS. Alternative 4 would have a major adverse impact on all seven at-grade crossing locations. Additionally, the at-grade rail crossing of Dorchester Road west of Meeting Street would create a queue from an ICTF train occurrence that impacts an interstate mainline in the design year 2038.

The opening year 2018 and design year 2038 Alternative 4 at-grade rail crossing analysis results are shown in Table 4.8-26 and Table 4.8-27, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 4 is shown in Figure 4.8-12.

Table 4.8-26  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 4

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,800	2.2	0.0	04:07	00:00	-	-	-	-	-	A
2	Attaway Street	4,500	3.3	0.0	03:47	00:00	-	-	-	-	-	A
3	North Rhett Avenue	16,200	3.3	0.0	07:16	00:00	-	-	-	-	-	D
4	Virginia Avenue	9,100	1.2	0.0	26:09	00:00	-	-	-	-	-	D
5	Avenue B	8,700	1.2	0.0	34:34	00:00	-	-	-	-	-	F
6	Dorchester Road (SC 642)	17,400	5.3	8.0	03:57	05:33	1,975	No	34.4	C	Minor	B
7	Accabee Road	3,100	5.3	8.0	03:10	05:32	450	No	20.9	C	Moderate	A
8	Misroon Street	500	5.3	8.0	03:10	05:32	75	No	21.8	C	Moderate	A
9	Hackemann Avenue	1,500	3.1	8.0	04:06	05:32	3,575	No	89.7	F	Major	C
10	Discher Street	3,100	5.3	8.0	03:09	05:31	3,500	No	104.3	F	Major	B
11	Pittsburgh Avenue	2,000	0.0	8.0	00:00	05:32	400	No	18.8	B	Minor	A
12	Meeting Street & Herbert Street	16,400 & 900	0.0	8.0	00:00	05:32	2,425	No	16.4	B	Minor	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-12.

Source: Appendix F.



Table 4.8-27  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 4

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,000	2.2	0.0	05:13	00:00	-	-	-	-	-	B
2	Attaway Street	6,200	3.3	0.0	06:21	00:00	-	-	-	-	-	B
3	North Rhett Avenue	24,200	3.3	0.0	09:44	00:00	-	-	-	-	-	F
4	Virginia Avenue	10,400	1.2	0.0	27:22	00:00	-	-	-	-	-	D
5	Avenue B	9,800	1.2	0.0	35:38	00:00	-	-	-	-	-	F
6	Dorchester Road (SC 642)	18,400	5.3	8.0	05:05	11:34	5,000	Yes	149.1	F	Major	B
7	Accabee Road	3,100	5.3	8.0	05:05	11:34	875	No	58.8	E	Major	A
8	Misroon Street	500	5.3	8.0	04:13	11:31	125	No	75.9	E	Major	A
9	Hackemann Avenue	1,500	3.1	8.0	05:29	11:31	>5,280	No	666.2	F	Major	E
10	Discher Street	3,200	5.3	8.0	04:12	10:46	>5,280	No	529.4	F	Major	E
11	Pittsburgh Avenue	2,100	0.0	8.0	00:00	10:46	800	No	78.6	E	Major	A
12	Meeting Street & Herbert Street	21,600 & 2,800	0.0	8.0	00:00	10:46	>5,280	No	65.2	E	Major	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-12.

Source: Appendix F.

#### 4.8.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

The following sections describe the transportation impacts associated with Alternative 5, which is described in detail in Section 2.4.6. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. The Alternative 5 impacts are summarized in Section 4.8.10.

Alternative 5 would be a variation of the Proposed Project with the project site being moved to the River Center project site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. The primary roadway network change would be the elimination of the McMillan Avenue/ Cosgrove Avenue Realignment in Alternative 5.

Same as Alternative 1 (Proposed Project), Alternative 5 would create a new at-grade rail crossing at the intersection of Meeting Street (US 52) and Herbert Street. This analyzed at-grade rail crossing network is identified by ID 12 in the tables.

Traffic patterns around the proposed ICTF at River Center change compared to the No-Action Alternative due to the ICTF and modifications to the roadway network. The distribution of the River Center project site ICTF truck traffic between the container Port Terminals and other regional sites would be the same as the project site, which is shown in Exhibit 4.8-1 in Section 4.8.3. Additionally, the total volume of truck, employee and visitor traffic destined to and from the proposed ICTF at River Center would be the same as the project site shown in Section 4.8.3. Roadway modifications, which are discussed in Section 2.4.6, lead to increased volumes compared to the No-Action Alternative primarily on Spruill Avenue, Noisette Boulevard and the Local Access Road. The opening year 2018 and design year 2038 Alternative 5 daily volumes are shown in Appendix F.

##### Construction

During construction of the ICTF and associated roadway improvements, Alternative 5 would have a negligible impact on I-26, I-526 and US 17 and a minor adverse impact on the operations of the North Charleston intersections. It is anticipated that at the peak of construction up to 200 trips per day would be generated. The construction traffic would primarily use major arterial roadways such as I-26, I-526, Cosgrove Avenue, McMillan Avenue, Rivers Avenue and Spruill Avenue. The 200 construction trips per day would only be a small fraction of the daily volumes on these roadways, especially the interstates. A maintenance of traffic (MOT) plan has not been developed but may include detours and temporary lane closures.

## Interstate 26

Consistent with the opening year 2018 No-Action Alternative, the morning congestion on I-26 occurs in the eastbound direction, and the evening congestion occurs in the westbound direction for Alternative 5. Approximately 13 percent of the total analyzed segments (AM and PM peak hours for eastbound and westbound I-26) would operate at Poor LOS and 26 percent would operate at Fair LOS. By the design year 2038, approximately 24 percent of the total analyzed segments would operate at Poor LOS and 22 percent would operate at Fair LOS. A summary of the I-26 freeway segment LOS by direction and peak hour is shown in Table 4.8-28.

Table 4.8-28  
I-26 Operations, Alternative 5

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	14 Segments (33%)	12 Segments (29%)	36 Segments (86%)	30 Segments (71%)	34 Segments (90%)	33 Segments (87%)	13 Segments (34%)	11 Segments (29%)
Fair	17 Segments (41%)	9 Segments (21%)	4 Segments (9%)	10 Segments (24%)	2 Segments (5%)	3 Segments (8%)	19 Segments (50%)	14 Segments (37%)
Poor	11 Segments (26%)	21 Segments (50%)	2 Segments (5%)	2 Segments (5%)	2 Segments (5%)	2 Segments (5%)	6 Segments (16%)	13 Segments (34%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-26.

Source: Appendix F.

In the opening year 2018 and design year 2038, Alternative 5 would have a negligible impact on the majority of the I-26 corridor in comparison with the No-Action Alternative. Alternative 5 would have a beneficial or adverse impact on a few segments due to a LOS change. The LOS change is a result of the segments having a density near a LOS threshold. All segments would only have a slight increase or decrease in density. A summary of the opening year 2018 and design year 2038 I-26 freeway impacts by direction and peak hour is shown in Table 4.8-29.



Table 4.8-29  
Number of I-26 Freeway Segment Impacts, Alternative 5

Impact		Eastbound				Westbound			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038	2018	2038	2018	2038
Beneficial	Major	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	1	0
	Minor	1	2	0	2	0	4	1	1
Negligible		37	39	41	39	36	34	34	36
Adverse	Minor	2	1	1	1	2	0	1	0
	Moderate	2	0	0	0	0	0	1	1
	Major	0	0	0	0	0	0	0	0

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-26.

Source: Appendix F.

## Interstate 526

Similar to the opening year 2018 No-Action Alternative, the majority of the congestion along I-526 would occur between Paul Cantrell Boulevard and Long Point Road. Approximately 23 percent of the total analyzed segments (AM and PM peak hours for eastbound and westbound I-526) would operate at Poor LOS and 39 percent would operate at Fair LOS. By the design year 2038, approximately 35 percent of the total analyzed segments would operate at Poor LOS and 34 percent would operate at Fair LOS. A summary of the I-526 freeway segment LOS by direction and peak hour is shown in Table 4.8-30.

Table 4.8-30  
I-526 Operations, Alternative 5

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	17 Segments (38%)	14 Segments (31%)	13 Segments (29%)	13 Segments (28%)	17 Segments (40%)	12 Segments (28%)	19 Segments (44%)	16 Segments (37%)
Fair	16 Segments (35%)	14 Segments (31%)	23 Segments (51%)	16 Segments (36%)	14 Segments (32%)	14 Segments (33%)	16 Segments (37%)	15 Segments (35%)
Poor	12 Segments (27%)	17 Segments (38%)	9 Segments (20%)	16 Segments (36%)	12 Segments (28%)	17 Segments (39%)	8 Segments (19%)	12 Segments (28%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-526.

Source: Appendix F.

In the opening year 2018 and design year 2038, Alternative 5 would have a negligible impact on the majority of the I-526 corridor in comparison with the No-Action Alternative. Alternative 5 would have a beneficial or adverse impact on a few segments due to a LOS change. The LOS change is a result of the segments having a density near a LOS threshold. All segments would only have a slight increase or decrease in density. A summary of the opening year 2018 and design year 2038 I-526 freeway impacts by direction and peak hour is shown in Table 4.8-31.

Table 4.8-31  
Number of I-526 Freeway Segment Impacts, Alternative 5

Impact		Eastbound				Westbound			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038	2018	2038	2018	2038
Beneficial	Major	1	1	0	2	2	0	0	0
	Moderate	0	0	1	0	0	0	0	0
	Minor	0	1	0	0	1	0	0	1
Negligible		43	41	44	39	40	38	43	36
Adverse	Minor	0	2	0	1	0	3	0	1
	Moderate	1	0	0	3	0	1	0	3
	Major	0	0	0	0	0	1	0	2

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between eastbound and westbound I-526.

Source: Appendix F.

## U.S. Highway 17

Similar to the opening year 2018 No-Action Alternative, the majority of the US 17 corridor would operate at a Good or Fair levels for Alternative 5. Only one freeway segment and no intersections would operate at Poor LOS in either the AM or PM peak hour. By the design year 2038, no additional freeway segments and three additional intersections would operate at Poor LOS in either the AM or PM peak hour. A summary of the US 17 freeway segment LOS by direction and peak hour is shown in Table 4.8-32. A summary of the US 17 signalized intersection operations is shown in Table 4.8-33.

Table 4.8-32  
US 17 Freeway Operations, Alternative 5

LOS	Eastbound				Westbound			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	10 Segments (100%)	9 Segments (90%)	8 Segments (80%)	5 Segments (50%)	11 Segments (100%)	8 Segments (73%)	11 Segments (100%)	10 Segments (91%)
Fair	0 Segments (10%)	1 Segment (10%)	1 Segment (10%)	4 Segments (40%)	0 Segments (0%)	3 Segments (27%)	0 Segments (0%)	1 Segment (9%)
Poor	0 Segments (0%)	0 Segments (0%)	1 Segment (10%)	1 Segment (10%)	0 Segments (0%)	0 Segments (0%)	0 Segments (0%)	0 Segments (0%)

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between northbound and southbound US 17.

Source: Appendix F.

Table 4.8-33  
US 17 Intersection Operations, Alternative 5

LOS	AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038
Good	2 Intersections (40%)	2 Intersections (40%)	3 Intersections (60%)	2 Intersections (40%)
Fair	3 Intersections (60%)	2 Intersections (40%)	2 Intersections (40%)	1 Intersection (20%)
Poor	0 Intersections (0%)	1 Intersection (20%)	0 Intersections (0%)	2 Intersections (40%)

Source: Appendix F.

In the opening year 2018, Alternative 5 would have a negligible impact on the majority of the US 17 corridor in comparison with the No-Action Alternative. Alternative 5 would have a beneficial impact on four US 17 segments (10 percent of the total segments) and two US 17 intersections (20 percent of the total intersections) in either the AM or PM peak hour. All four of the freeway segments and one of the two intersections would have a minor beneficial impact, which equates to an improvement of one LOS grade. The intersection of US 17 at Shelmore Boulevard would have a moderate beneficial



impact in the AM peak hour. Alternatively, Alternative 5 would have an adverse impact on no US 17 segments and one US 17 intersection (10 percent of the total intersections) in either the AM or PM peak hour. The one intersection would have a minor adverse impact, which equates to a degradation of one LOS grade. In the design year 2038, Alternative 5 would have a negligible impact on all but one of the analyzed US 17 freeway segments and all of the US 17 intersections. Alternative 5 would have a moderate beneficial impact on the northbound US 17 diverge to Coleman Boulevard in the PM peak hour but would only experience a small decrease in density. A summary of the opening year 2018 and design year 2038 US 17 freeway impacts by direction and peak hour is shown in Table 4.8-34. A summary of the opening year 2018 and design year 2038 US 17 intersection impacts by peak hour is shown in Table 4.8-35.

Table 4.8-34  
US 17 Freeway Segment Impacts for Alternative 5

Impact		Northbound				Southbound			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038	2018	2038	2018	2038
Beneficial	Major	0	0	0	0	0	0	0	0
	Moderate	0	0	0	1	0	0	0	0
	Minor	2	0	0	0	2	0	0	0
Negligible		8	10	10	9	9	11	11	11
Adverse	Minor	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0
	Major	0	0	0	0	0	0	0	0

Note: Segments include basic freeway, weave, and ramp merge and diverge locations, which may vary in number between northbound and southbound US 17.

Source: Appendix F.

Table 4.8-35  
US 17 Intersection Impacts for Alternative 5

Impact		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038
Beneficial	Major	0	0	0	0
	Moderate	1	0	0	0
	Minor	0	0	1	0
Negligible		3	5	4	5
Adverse	Minor	1	0	0	0
	Moderate	0	0	0	0
	Major	0	0	0	0

Source: Appendix F.

### North Charleston Intersections

Alternative 5 included the analysis of 33 signalized intersections and 11 stop-controlled intersections within North Charleston. The ICTF truck driveway would replace the east leg of Cosgrove Avenue at the signalized intersection with Spruill Avenue. The ICTF employee and visitor driveway would create a new stop-controlled intersection at St. Johns Avenue where Turnbull Avenue currently exists. The segment of McMillan Avenue between St. Johns Avenue and Noisette Boulevard would be closed, which eliminates two of the stop-controlled intersections analyzed as part of the No-Action Alternative. Additionally, the removal of Viaduct Road eliminates two stop-controlled intersections, which are the ramps connecting Viaduct Road and Bainbridge Avenue. The existing stop-controlled Viaduct Road intersection at North Hobson Avenue and South Hobson Avenue is replaced with a stop-controlled intersection where the Local Access Road, North Hobson Avenue and South Hobson Avenue meet. Finally, Bainbridge Avenue would be slightly realigned at "T" into the Local Access Road as a signalized intersection.

The worst of the AM and PM peak hour intersection LOS for the Alternative 5 opening year 2018 and design year 2038 are shown in Figure 4.8-13 and Figure 4.8-14 respectively. A summary of the North Charleston intersection operations is shown in Table 4.8-36.

Consistent with the opening year 2018 No-Action Alternative, within North Charleston, the majority of the analyzed intersections operate with little delay. The stop-controlled intersection of the I-526 Eastbound Off-Ramp at Virginia Avenue is the only intersections that would operate with a Poor LOS.

Table 4.8-36  
North Charleston Intersection Operations, Alternative 5

LOS	Signalized Intersections				Stop-Controlled Intersections			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	2018	2038	2018	2038	2018	2038	2018	2038
Good	33 (100%)	30 (91%)	31 (94%)	29 (88%)	9 (82%)	7 (64%)	11 (100%)	8 (73%)
Fair	0 (6%)	3 (9%)	2 (6%)	2 (6%)	1 (9%)	0 (0%)	0 (0%)	1 (9%)
Poor	0 (0%)	0 (0%)	0 (0%)	2 (6%)	1 (9%)	4 (36%)	0 (0%)	2 (18%)

Source: Appendix F.

By the design year 2038, a few additional intersections would operate with Poor LOS but the majority of the intersections would still operate with delay. The signalized intersection of Cosgrove Avenue at Rivers Avenue and Cosgrove Avenue at Azalea Drive along with the stop-controlled intersections of Turnbull Avenue at Noisette Boulevard, Avenue B at Virginia Avenue, Montague Avenue at Virginia Avenue and the I-526 Eastbound Off-Ramp at Virginia Avenue are the only intersections that would operate with a Poor LOS.

A summary of the opening year 2018 and design year 2038 Alternative 5 North Charleston intersection impacts by peak hour is shown in Table 4.8-37. The stop-controlled intersection of the ICTF employee and visitor driveway at St. Johns Avenue did not exist in the No-Action Alternative so was only analyzed in Alternative 5. An impact cannot be defined for this intersection because it was not analyzed in the No-Action Alternative. However, the intersection would operate at Good LOS in the opening year 2018 and design year 2038 Alternative 5 for both the AM and PM peak hours.

In the opening year 2018, Alternative 5 would have a negligible impact on the majority of the analyzed intersections in North Charleston compared with the No-Action Alternative. Alternative 5 would have a beneficial impact on eight intersections (9 percent of the total intersections) in either the AM or PM peak hour. Seven of the eight intersections would have a minor beneficial impact, which equates to an improvement of one LOS grade. The stop controlled Avenue B at Virginia Avenue intersection would have a beneficial moderate impact as the LOS improves from LOS E to LOS D in the AM peak hour, but would only have a small decrease in delay. Alternatively, Alternative 5 would have an adverse impact on five intersections (6 percent of the total intersections) in either the AM or PM peak hour. All five of the intersections would have a minor adverse impact, which equates to a degradation of one LOS grade.



Table 4.8-37  
North Charleston Intersection Impacts, Alternative 5

Impact		AM Peak Hour		PM Peak Hour	
		2018	2038	2018	2038
Beneficial	Major	0	0	0	0
	Moderate	1	1	0	1
	Minor	4	2	3	1
Negligible		35	33	38	36
Adverse	Minor	3	5	2	3
	Moderate	0	1	0	1
	Major	0	1	0	1

Source: Appendix F.

In the design year 2038, similar to the opening year 2018, Alternative 5 would have a negligible impact on the majority of the analyzed intersections in North Charleston compared with the No-Action Alternative. Alternative 5 would have a beneficial impact on five intersections (6 percent of the total intersections) in either the AM or PM peak hour. Three of the five intersections would have a minor beneficial impact, which equates to an improvement of one LOS grade. A moderate beneficial impact would be experienced by the signalized intersections of Spruill Avenue at McMillan Avenue in both the AM and PM peak hours. The intersection LOS would improve because the traffic volume on McMillan Avenue would go down in Alternative 5 as McMillan Avenue would be closed between St. Johns Avenue and Noisette Boulevard to accommodate the ICTF.

Alternatively in the design year 2038, Alternative 5 would have an adverse impact on 12 intersections (14 percent of the total intersections) in either the AM or PM peak hour. Eight of the twelve intersections would have a minor adverse impact, which equates to a degradation of one LOS grade. A moderate adverse impact would be experienced by the stop-controlled intersections of Turnbull Avenue at Noisette Boulevard in the AM peak hour and Avenue B at Virginia Avenue in the PM peak hour. The stop-controlled Montague Avenue at Virginia Avenue intersection would have an adverse major impact in both the AM and PM peak hours. Traffic volumes at these three intersections would increase due to the closure of McMillan Avenue between St. Johns Avenue and Noisette Boulevard and due to the additional ICTF employee and visitor traffic.

The I-26 ramp terminal intersections at Cosgrove Avenue and I-26 Eastbound ramp terminal intersection at Montague Avenue are neither signalized nor stop-controlled. The ramp terminal intersections act as merge, diverge or weave elements along Cosgrove Avenue and Montague Avenue. All ten of the elements would operate at Good LOS during both the AM and PM peak hours in the opening year 2018 and design year 2038 Alternative 5.

In the opening year 2018, two freeway elements were analyzed on the Port Access Road. The HLT would not be open to traffic in the year 2018, so all eastbound Port Access Road traffic would be destined to the Local Access Road and all westbound Port Access Road traffic would come from the Local Access Road. The two analyzed elements were the eastbound Port Access Road merge from the eastbound and westbound I-26 ramps and the split of the westbound Port Access Road to eastbound and westbound I-26. Same as the No-Action Alternative, both of these elements would operate at Good LOS during both the AM and PM peak hours in the opening year.

In the design year 2038, the analysis also included the on- and off- ramps from the Port Access Road to the Local Access Road. The HLT would be open, and the Port Access Road would serve most of the traffic to and from the facility along with the traffic destined to the Local Access Road. Same as the No-Action Alternative, all four freeway elements on the Port Access Road would operate at Good LOS during both the AM and PM peak hours in the design year.

### At-Grade Rail Crossings

For Alternative 5, the number of ICTF and other commodity train occurrences and the average duration of the occurrences would be the same as Alternative 1 (Proposed Project), while the roadway volumes would be different. The opening year 2018 and design year 2038 Alternative 5 at-grade rail crossing analysis results are shown in Table 4.8-38 and Table 4.8-39, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 5 is shown in Figure 4.8-15.

Compared with the No-Action Alternative, Alternative 5 would reroute approximately 1.2 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 5 would have on the at-grade crossings along the Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

Alternative 5 would have an impact on several of the at-grade rail crossings in North Charleston due to changing train and vehicular volumes and routes. The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase nearly 120 percent from the opening year 2018 No-Action Alternative to Alternative 5. In the design year 2038, the daily combined total rail occupancy time would increase over 180 percent.

Table 4.8-38  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 5

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,600	2.2	4.0	04:07	05:34	2,925	No	18.2	B	Minor	A
2	Attaway Street	4,500	3.7	4.0	03:47	05:38	775	No	14.3	B	Minor	A
3	North Rhett Avenue	16,400	3.7	4.0	07:16	05:38	>5,280	Yes	50.3	D	Negligible	D
4	Virginia Avenue	9,200	1.1	4.0	26:09	05:42	900	No	57.6	E	Moderate	D
5	Avenue B	6,800	1.1	4.0	34:34	05:40	1,900	No	114.0	F	Negligible	F
6	Dorchester Road (SC 642)	17,000	5.3	4.0	03:57	05:33	2,125	No	25.3	C	Minor	B
7	Accabee Road	3,100	5.3	4.0	03:10	05:32	450	No	15.1	B	Minor	A
8	Misroon Street	500	5.3	4.0	03:10	05:32	75	No	13.5	B	Minor	A
9	Hackemann Avenue	1,500	3.1	4.0	04:06	05:32	3,525	No	61.3	E	Moderate	C
10	Discher Street	3,100	5.3	4.0	03:09	05:31	3,325	No	59.6	E	Major	B
11	Pittsburgh Avenue	2,000	0.0	4.0	00:00	05:32	400	No	9.4	A	Negligible	A
12	Meeting Street & Herbert Street	16,300 & 900	0.0	4.0	00:00	05:32	2,450	No	8.2	A	Negligible	--

1. Analyzed at-grade crossing locations are shown in Figure 4.8-15.

Source: Appendix F.



Table 4.8-39  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 5

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,200	2.1	4.0	05:13	10:52	>5,280	Yes	64.3	E	Major	B
2	Attaway Street	6,300	3.7	4.0	06:21	10:52	2,200	No	50.4	D	Moderate	B
3	North Rhett Avenue	23,900	3.7	4.0	09:44	10:52	>5,280	Yes	185.1	F	<sup>2</sup> Negligible	F
4	Virginia Avenue	11,300	1.1	4.0	27:22	10:51	2,700	Yes	87.5	F	Major	D
5	Avenue B	11,700	1.1	4.0	35:38	10:50	>5,280	No	164.8	F	<sup>2</sup> Negligible	F
6	Dorchester Road (SC 642)	17,300	5.2	4.0	05:05	11:34	4,650	Yes	84.0	F	Major	B
7	Accabee Road	3,100	5.2	4.0	05:05	11:34	875	No	37.6	D	Major	A
8	Misroon Street	500	5.2	4.0	04:13	11:31	125	No	43.2	D	Major	A
9	Hackemann Avenue	1,500	3.1	4.0	05:29	11:31	>5,280	No	378.9	F	Major	E
10	Discher Street	3,200	5.2	4.0	04:12	10:46	>5,280	No	295.0	F	Major	E
11	Pittsburgh Avenue	2,100	0.0	4.0	00:00	10:46	800	No	38.3	D	Major	A
12	Meeting Street & Herbert Street	20,700 & 2,800	0.0	4.0	00:00	10:46	>5,280	No	32.7	C	Moderate	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-15.

2. Although the relative impact as compared to the No-Action is negligible the average delay per vehicle increased >20%.

Source: Appendix F.

In the opening year 2018, four at-grade crossings would operate with a Poor LOS. These four locations are the at-grade crossings of Virginia Avenue north of Empire Avenue, Avenue B east of Virginia Avenue, Hackemann Avenue between Meeting Street and King Street, and Discher Street between Meeting Street and King Street. Only the at-grade rail crossing of Discher Street would have a major adverse impact. The at-grade rail crossing of Avenue B would have a negligible impact because it would operate with a LOS F in both the No-Action Alternative and Alternative 5 and the average vehicle delay would increase less than 10 percent. The at-grade rail crossing of Virginia Avenue and Hackemann Avenue would have a moderate adverse impact as the LOS would degrade from a LOS D in the No-Action Alternative to a LOS E in Alternative 5. None of the at-grade rail crossings would create a queue from an ICTF train occurrence that impacts an interstate mainline in the opening year 2018. The at-grade rail crossings of North Rhett Avenue south of I-526 would create a queue from an ICTF train occurrence that impacts the I-526 mainline in the opening year 2018. However, this would also occur with an other commodity train occurrence in the opening year 2018 No-Action Alternative.

By the design year 2038, the average ICTF train crossing duration time would approximately double from the opening year 2018 value. The longer ICTF train crossing durations, as well as higher roadway volumes and longer other commodity train crossing durations, would lead to seven of the 12 at-grade crossing locations operating with a Poor LOS and ten of the twelve analyzed at-grade rail crossings having a major adverse impact in the design year 2038. Additionally, the at-grade rail crossings of Rivers Avenue north of Taylor Street, North Rhett Avenue south of I-526, Virginia Avenue north of Empire Avenue, and Dorchester Road west of Meeting Street would create a queue from an ICTF train occurrence that impacts an interstate mainline in the design year 2038. However, in the No-Action Alternative, only the Dorchester Road at-grade crossing would not impact an interstate mainline.

#### **4.8.8      Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

The following sections describe the transportation impacts associated with Alternative 6, which is described in detail in Section 2.4.7. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. The Alternative 6 impacts are summarized in Section 4.8.10.

Alternative 6 would be a variation of the Proposed Project with the project site being moved to the River Center project site and the southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW). Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. The daily volumes for Alternative 6 would be the same as Alternative 5, which are shown in Appendix F.

## Construction, Interstate 26, Interstate 526, U.S. Highway 17 and North Charleston Intersections

Alternative 6 would have the same operations and impacts during construction, Interstate 26, Interstate 526, U.S. Highway 17 and North Charleston Intersections as Alternative 5, which is described in Section 4.8.7.

### At-Grade Rail Crossings

Alternative 6 would have the same operations and impacts to the first nine at-grade rail crossings analyzed in Alternative 5. Compared with the No-Action Alternative, same as Alternative 5, Alternative 6 would reroute approximately 1.2 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 6 would have on the at-grade crossings along the Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

In Alternative 6, the southern alignment would only go down to around Kingsworth Avenue. Therefore the existing at-grade crossings of Pittsburgh Avenue and Discher Street would not be impacted with ICTF train occurrences and the new at-grade crossing of Meeting Street at Herbert Street would not be created for Alternative 6. Alternative 6 would create two new at-grade crossings. The at-grade crossings would be of Meeting Street and Spruill Avenue near Kingsworth Avenue. Because these two at-grade crossings are located close together and their operations would influence each other, their impacts were identified as one location. The at-grade crossings of Meeting Street and Spruill Avenue would operate at LOS D in both the opening year 2018 and design year 2038. Alternative 6 would have a major adverse impact on these two new at-grade crossings. When there is an ICTF train occurrence, only I-26 and King Street Extension would serve as a connection between North Charleston and Charleston. The opening year 2018 and design year 2038 Alternative 6 at-grade rail crossing analysis results are shown in Table 4.8-40 and Table 4.8-41, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 6 is shown in Figure 4.8-16.

The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase nearly 100 percent from the opening year 2018 No-Action Alternative to Alternative 6. In the design year 2038, the daily combined total rail occupancy time would increase approximately 150 percent.

Table 4.8-40  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 6

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,600	2.2	4.0	04:07	05:34	2,925	No	18.2	B	Minor	A
2	Attaway Street	4,500	3.7	4.0	03:47	05:38	775	No	14.3	B	Minor	A
3	North Rhett Avenue	16,400	3.7	4.0	07:16	05:38	>5,280	Yes	50.3	D	Negligible	D
4	Virginia Avenue	9,200	1.1	4.0	26:09	05:42	900	No	57.5	E	Moderate	D
5	Avenue B	6,800	1.1	4.0	34:34	05:40	1,900	No	113.8	F	Negligible	F
6	Dorchester Road (SC 642)	17,000	5.3	4.0	03:57	05:33	2,125	No	25.3	C	Minor	B
7	Accabee Road	3,100	5.3	4.0	03:10	05:32	450	No	15.1	B	Minor	A
8	Misroon Street	500	5.3	4.0	03:10	05:32	75	No	13.5	B	Minor	A
9	Hackemann Avenue	1,500	3.1	4.0	04:06	05:32	3,525	No	61.2	E	Moderate	C
10	Discher Street	3,100	5.3	0.0	03:09	00:00	-	-	-	-	-	B
11	Pittsburgh Avenue	2,000	0.0	0.0	00:00	00:00	-	-	-	-	-	A
14	Meeting Street & Spruill Avenue	7,700 & 10,100	0.0	4.0	00:00	05:32	4,400	No	41.0	D	Major	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-16.

Source: Appendix F.



Table 4.8-41  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 6

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,200	2.1	4.0	05:13	10:52	>5,280	Yes	64.2	E	Major	B
2	Attaway Street	6,300	3.7	4.0	06:21	10:52	2,200	No	50.4	D	Moderate	B
3	North Rhett Avenue	23,900	3.7	4.0	09:44	10:52	>5,280	Yes	185.0	F	<sup>2</sup> Negligible	F
4	Virginia Avenue	11,300	1.1	4.0	27:22	10:51	2,700	Yes	87.1	F	Major	D
5	Avenue B	11,700	1.1	4.0	35:38	10:50	>5,280	No	163.9	F	<sup>2</sup> Negligible	F
6	Dorchester Road (SC 642)	17,300	5.2	4.0	05:05	11:34	4,650	Yes	84.0	F	Major	B
7	Accabee Road	3,100	5.2	4.0	05:05	11:34	875	No	37.6	D	Major	A
8	Misroon Street	500	5.2	4.0	04:13	11:31	125	No	43.2	D	Major	A
9	Hackemann Avenue	1,500	3.1	4.0	05:29	11:31	>5,280	No	378.8	F	Major	E
10	Discher Street	3,200	5.3	0.0	04:12	0:00	-	-	-	-	-	E
11	Pittsburgh Avenue	2,100	0.0	0.0	00:00	00:00	-	-	-	-	-	A
14	Meeting Street & Spruill Avenue	11,300 & 12,000	0.0	4.0	00:00	10:46	>5,280	No	44.1	D	Major	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-16.

2. Although the relative impact as compared to the No-Action is negligible the average delay per vehicle increased >20%.

Source: Appendix F.

#### 4.8.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)

The following sections describe the transportation impacts associated with Alternative 7, which is described in detail in Section 2.4.8. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operations of the facility. The permanent operations analysis was performed for the year in which the proposed ICTF would open, 2018, and the design year 2038. The Alternative 7 impacts are summarized in Section 4.8.10.

Alternative 7 would be a variation of the Proposed Project with the project site being moved to the River Center project site and NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. The daily volumes for Alternative 7 would be the same as Alternative 5, which are shown in Appendix F.

##### Construction, Interstate 26, Interstate 526, U.S. Highway 17 and North Charleston Intersections

Alternative 7 would have the same operations and impacts during construction, Interstate 26, Interstate 526, U.S. Highway 17 and North Charleston Intersections as Alternative 5, which is described in Section 4.8.7.

##### At-Grade Rail Crossings

In Alternative 7 both CSX and NS would use the southern rail alignment to Milford Street. Since NS would not use the Alternative 5 northern alignment, Alternative 7 would not impact the at-grade crossings of Rivers Avenue, Virginia Avenue and Avenue B. The at-grade rail crossings of Attaway Street and North Rhett Avenue would differ compared to the No-Action Alternative because Alternative 7 reroutes approximately 1.6 other commodity trains per day from the Reads Branch line to the Park Circle and Bexley Corridors. The impact Alternative 7 would have on the at-grade crossings along the Reads Branch, Park Circle and Bexley Corridors was not analyzed because no ICTF trains would use these corridors.

Alternative 7 would have twice as many ICTF train occurrences than Alternative 5, eight per day, at the at-grade crossings along the southern alignment. The daily combined total rail occupancy time at the analyzed roadway crossings, which is defined by the number of occurrences multiplied by the average duration of each occurrence, would increase nearly 135 percent from the opening year 2018 No-Action Alternative to Alternative 4. In the design year 2038, the daily combined total rail occupancy time would increase approximately 215 percent.

Alternative 7 would have an impact on all seven of the analyzed at-grade rail crossings along the southern alignment. In the opening year 2018, two at-grade crossings would operate with a Poor

LOS. These two locations are the at-grade crossings of Hackemann Avenue and Discher street, both of which are located between Meeting Street and King Street. Alternative 7 would have a major adverse impact on both of these crossings as Meeting Street and King Street would experience queueing and delay. None of the at-grade rail crossings would create a queue from an ICTF train occurrence that impacts an interstate mainline in the opening year 2018.

By the design year 2038, the average ICTF train crossing duration time would approximately double from the opening year 2018 value. The longer ICTF train crossing durations, as well as higher roadway volumes and longer other commodity train crossing durations, would lead to all seven of the at-grade crossing locations along the southern alignment operating with a Poor LOS. Alternative 7 would have a major adverse impact on all seven at-grade crossing locations. Additionally, the at-grade rail crossing of Dorchester Road west of Meeting Street would create a queue from an ICTF train occurrence that impacts an interstate mainline in the design year 2038.

The opening year 2018 and design year 2038 Alternative 7 at-grade rail crossing analysis results are shown in Table 4.8-42 and Table 4.8-43, respectively. The at-grade rail crossing daily LOS for the opening year 2018 and design year 2038 of Alternative 7 is shown in Figure 4.8-17.

#### 4.8.10 Related Activities

For traffic and transportation, the impacts associated with the related activity being built are incorporated into the impacts previously described in Section 4.8. The impacts to the transportation network are a result of the trains to and from the Navy Base ICTF not the physical tracks.

Table 4.8-42  
Opening Year 2018 At-Grade Rail Crossings Analysis Results for Alternative 7

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	32,600	2.2	0.0	04:07	00:00	-	-	-	-	-	A
2	Attaway Street	4,500	3.3	0.0	03:47	00:00	-	-	-	-	-	A
3	North Rhett Avenue	16,400	3.3	0.0	07:16	00:00	-	-	-	-	-	D
4	Virginia Avenue	9,200	1.2	0.0	26:09	00:00	-	-	-	-	-	D
5	Avenue B	6,800	1.2	0.0	34:34	00:00	-	-	-	-	-	F
6	Dorchester Road (SC 642)	17,000	5.3	8.0	03:57	05:33	2,125	No	39.5	D	Moderate	B
7	Accabee Road	3,100	5.3	8.0	03:10	05:32	450	No	22.1	C	Moderate	A
8	Misroon Street	500	5.3	8.0	03:10	05:32	75	No	21.8	C	Moderate	A
9	Hackemann Avenue	1,500	3.1	8.0	04:06	05:32	3,525	No	100.8	F	Major	C
10	Discher Street	3,100	5.3	8.0	03:09	05:31	3,325	No	101.5	F	Major	B
11	Pittsburgh Avenue	2,000	0.0	8.0	00:00	05:32	400	No	18.8	B	Minor	A
12	Meeting Street & Herbert Street	16,300 & 900	0.0	8.0	00:00	05:32	2,450	No	16.4	B	Minor	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-17.

Source: Appendix F.



Table 4.8-43  
Design Year 2038 At-Grade Rail Crossings Analysis Results for Alternative 7

ID <sup>1</sup>	Roadway Segment at Rail Crossing	Daily Volume	Number of Daily Train Crossings		Average Crossing Duration (min:sec)		Max ICTF Train Queue (feet)	ICTF Train Impact to Interstate Mainline	Roadway Network Delay per Vehicle (seconds per vehicle)	LOS	Impact	No-Action LOS
			Other	ICTF	Other	ICTF						
1	Rivers Avenue (US 78)	37,200	2.2	0.0	05:13	00:00	-	-	-	-	-	B
2	Attaway Street	6,300	3.3	0.0	06:21	00:00	-	-	-	-	-	B
3	North Rhett Avenue	23,900	3.3	0.0	09:44	00:00	-	-	-	-	-	F
4	Virginia Avenue	11,300	1.2	0.0	27:22	00:00	-	-	-	-	-	D
5	Avenue B	11,700	1.2	0.0	35:38	00:00	-	-	-	-	-	F
6	Dorchester Road (SC 642)	17,300	5.3	8.0	05:05	11:34	4,650	Yes	148.8	F	Major	B
7	Accabee Road	3,100	5.3	8.0	05:05	11:34	875	No	63.0	E	Major	A
8	Misroon Street	500	5.3	8.0	04:13	11:31	125	No	76.8	E	Major	A
9	Hackemann Avenue	1,500	3.1	8.0	05:29	11:31	>5,280	No	699.6	F	Major	E
10	Discher Street	3,200	5.3	8.0	04:12	10:46	>5,280	No	536.5	F	Major	E
11	Pittsburgh Avenue	2,100	0.0	8.0	00:00	10:46	800	No	76.7	E	Major	A
12	Meeting Street & Herbert Street	20,700 & 2,800	0.0	8.0	00:00	10:46	>5,280	No	65.3	E	Major	-

1. Analyzed at-grade crossing locations are shown in Figure 4.8-17.

Source: Appendix F.

## 4.8.11 Summary of Impacts Table

Table 4.8-44  
Summary of Impacts, Traffic and Transportation

Alternative	I-26	I-526	US 17	North Charleston Intersections	At-Grade Rail Crossings
<b>No-Action</b>	None	None	None	None	None
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Negligible, short-term impact during construction. Negligible, permanent impact on majority of I-26 corridor in the opening year 2018 and design year 2038; beneficial or adverse permanent impact on a few segments due to an LOS change.	Negligible, short-term impact during construction. Negligible, permanent impact on majority of I-526 corridor in the opening year 2018 and design year 2038; beneficial or adverse permanent impact on a few segments due to an LOS change.	Negligible, short-term impact during construction. Negligible, permanent impact on the opening year 2018 and design year 2038 US 17 operations as the Proposed Project would have minimal influence on the US 17 traffic volumes.	Minor, short-term adverse impact during construction. Minor, permanent adverse impact on the opening year 2018 and design year 2038 North Charleston intersection operations. Traffic patterns would change but slightly more intersections would degrade than improve operations.	Negligible, short-term impact during construction. Moderate, permanent adverse impact on the opening year 2018 and major, permanent adverse impact design year 2038 at-grade crossing operations as the Proposed Project would increase the frequency and number of train occurrences in North Charleston. Additionally, one new at-grade crossing would be created.
<b>2: CSX – Milford / NS – S-line</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) but with a slightly different number of intersections	Negligible, short-term impact during construction. Major, permanent adverse impact on the opening year 2018 and design year 2038 at-grade crossing operations as the Proposed Project would increase the frequency and number of train occurrences in North Charleston. Additionally, two new at-grade crossings would be created.

Alternative	I-26	I-526	US 17	North Charleston Intersections	At-Grade Rail Crossings
<b>3: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Similar to Alternative 2 but with different at-grade rail crossing locations and operations
<b>4: CSX &amp; NS – Milford</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) but with different at-grade rail crossing locations and operations
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Negligible, short-term impact during construction. Negligible, permanent impact on majority of I-26 corridor in the opening year 2018 and design year 2038; beneficial or adverse, permanent impact on a few segments due to an LOS change.	Negligible, short-term impact during construction. Negligible, permanent impact on majority of I-526 corridor in the opening year 2018 and design year 2038; beneficial or adverse, permanent impact on a few segments due to an LOS change.	Negligible, short-term impact during construction. Negligible, permanent impact on the opening year 2018 and design year 2038 US 17 operations as Alternative 5 would have minimal influence on the US 17 traffic volumes.	Minor, short-term adverse impact during construction. Minor, permanent adverse impact on the opening year 2018 and design year 2038 North Charleston intersection operations. Traffic patterns would change but slightly more intersections would degrade than improve operations.	Negligible, short-term impact during construction. Moderate, permanent adverse impact on the opening year 2018 and major, permanent adverse impact on design year 2038 at-grade crossing operations as Alternative 5 would increase the frequency and number of train occurrences in North Charleston. Additionally, one new at-grade crossing would be created.

Alternative	I-26	I-526	US 17	North Charleston Intersections	At-Grade Rail Crossings
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Negligible, short-term impact during construction. Major, permanent adverse impact on the opening year 2018 and design year 2038 at-grade crossing operations as Alternative 5 would increase the frequency and number of train occurrences in North Charleston. Additionally, two new at-grade crossings would be created.
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Similar to Alternative 5 but with different at-grade rail crossing locations and operations

## 4.8.12 Mitigation

### 4.8.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Perform Surface Transportation Study to identify rail and traffic impacts to traffic associated with the Proposed Project. (Minimization)
- Project has been designed to enhance efficiency of train movements so that trains are not required to stop while accessing the intermodal terminal and exacerbating traffic congestion associated with at-grade crossings. (Minimization)
- \*Provide access to St. John's Ave. for residents and businesses located on the former Navy Base and west of project North Lead railroad track. (Minimization)



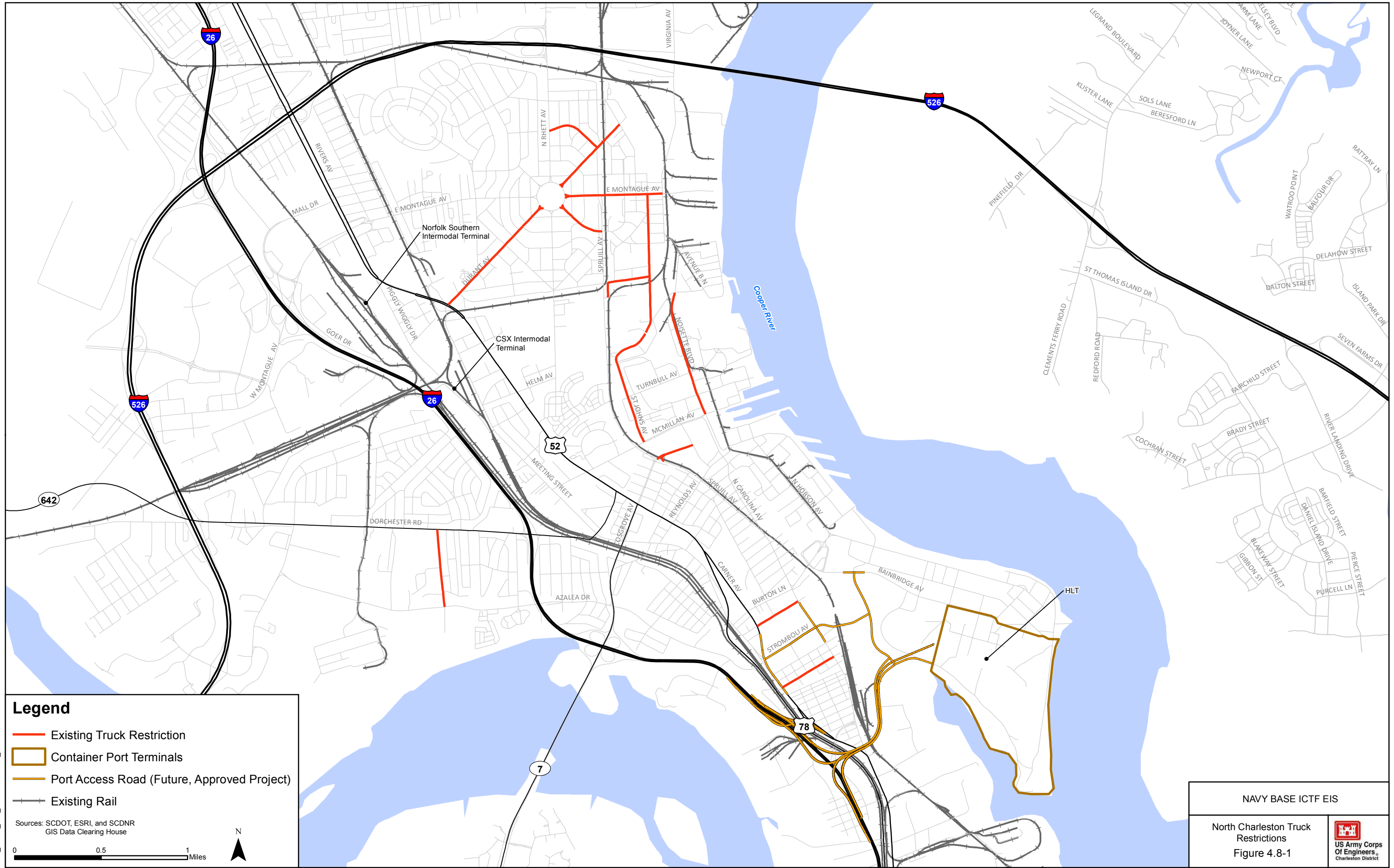
- \*Evaluate engineering options to minimize traffic impacts near the southern loop in response to City of Charleston request. (Minimization)
- Extend Cosgrove Ave. with a new overpass over the NBIF north rail lead to facilitate access to the CNC. (Minimization)
- Construct improvements to Bainbridge Avenue and N. Hobson Avenue intersection. (Minimization)
- Construct auxiliary turn lanes at the NBIF entrance to minimize queuing and reduce traffic delays on N. Hobson Avenue. (Minimization)
- Maintain Viaduct Road overpass until the local segment of the port access road is complete. (Minimization)
- Construct a private road to eliminate truck traffic on local roadways. (Minimization)
- \*Open the gate at Turnbull Avenue to provide multiple entry/exit routes for residences along St. John's Avenue. (Minimization)
- \*Locate roadway improvements to minimize/avoid at-grade crossings and traffic delays associated with rail operations. (Minimization)
- \*Additional intermodal capacity will encourage rail use and reduce truck traffic on local roads. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to traffic and transportation is also provided in Chapter 6.

#### **4.8.12.2 Additional Potential Mitigation Measures**

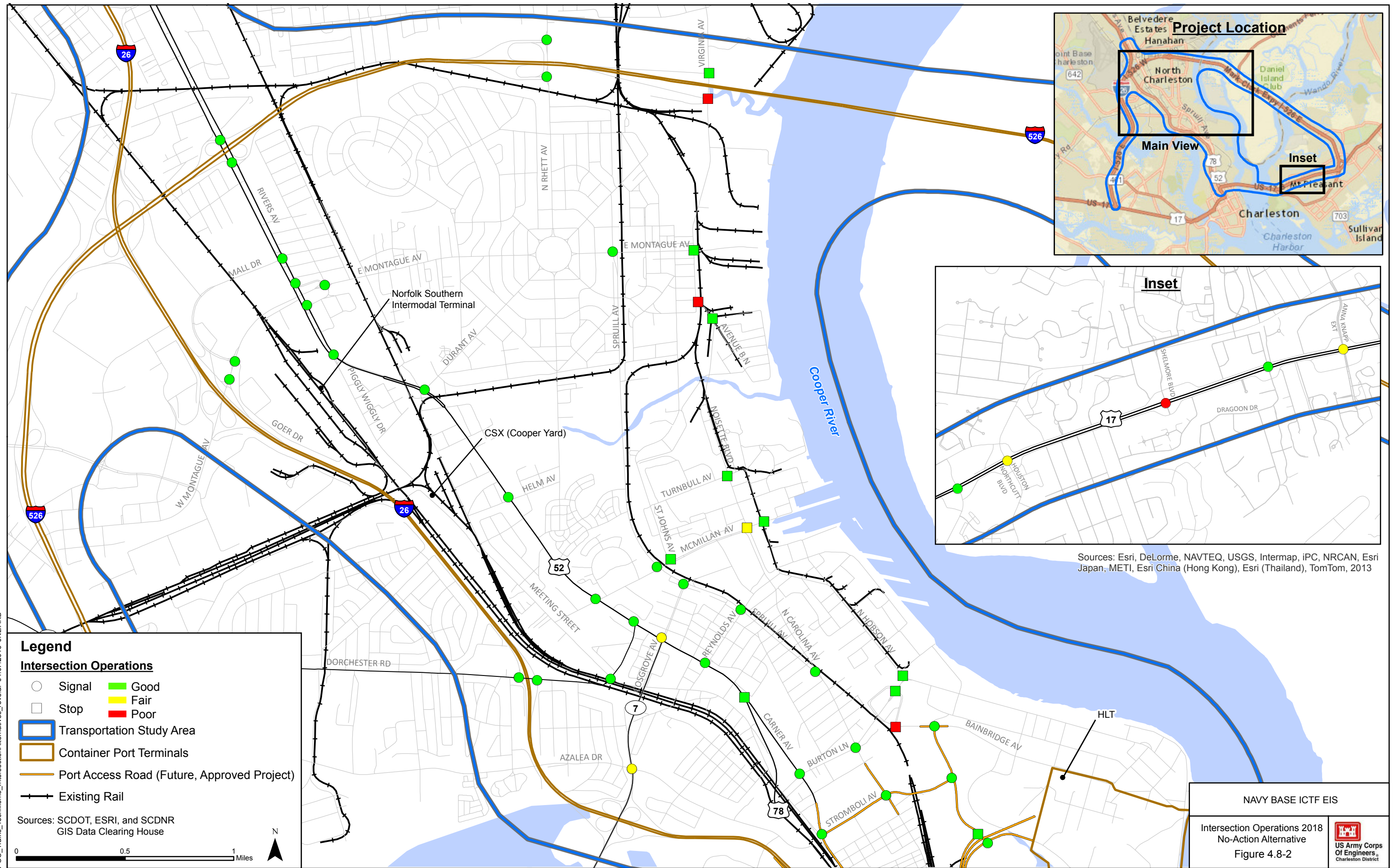
No additional mitigation measures have been identified by the Corps.

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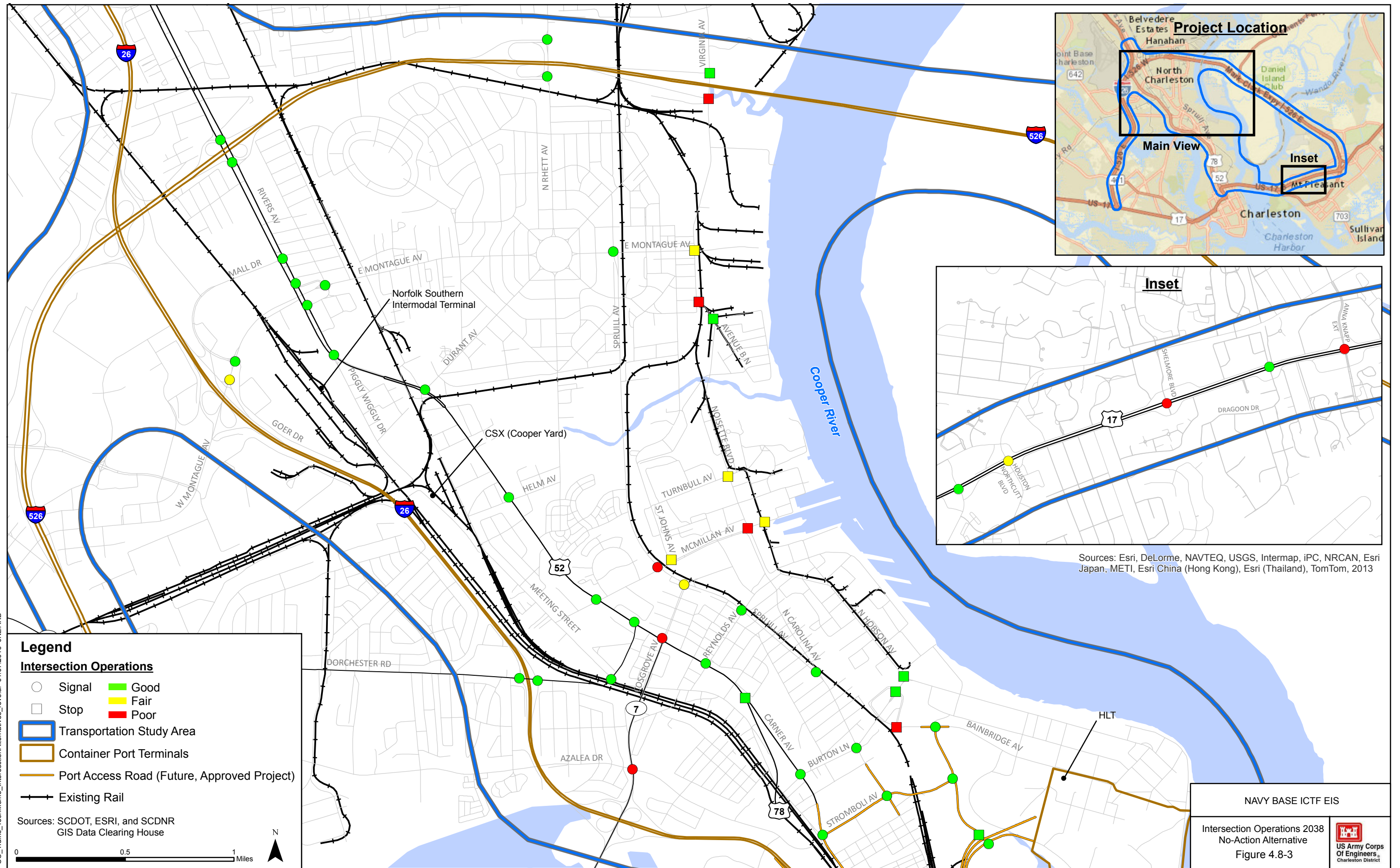






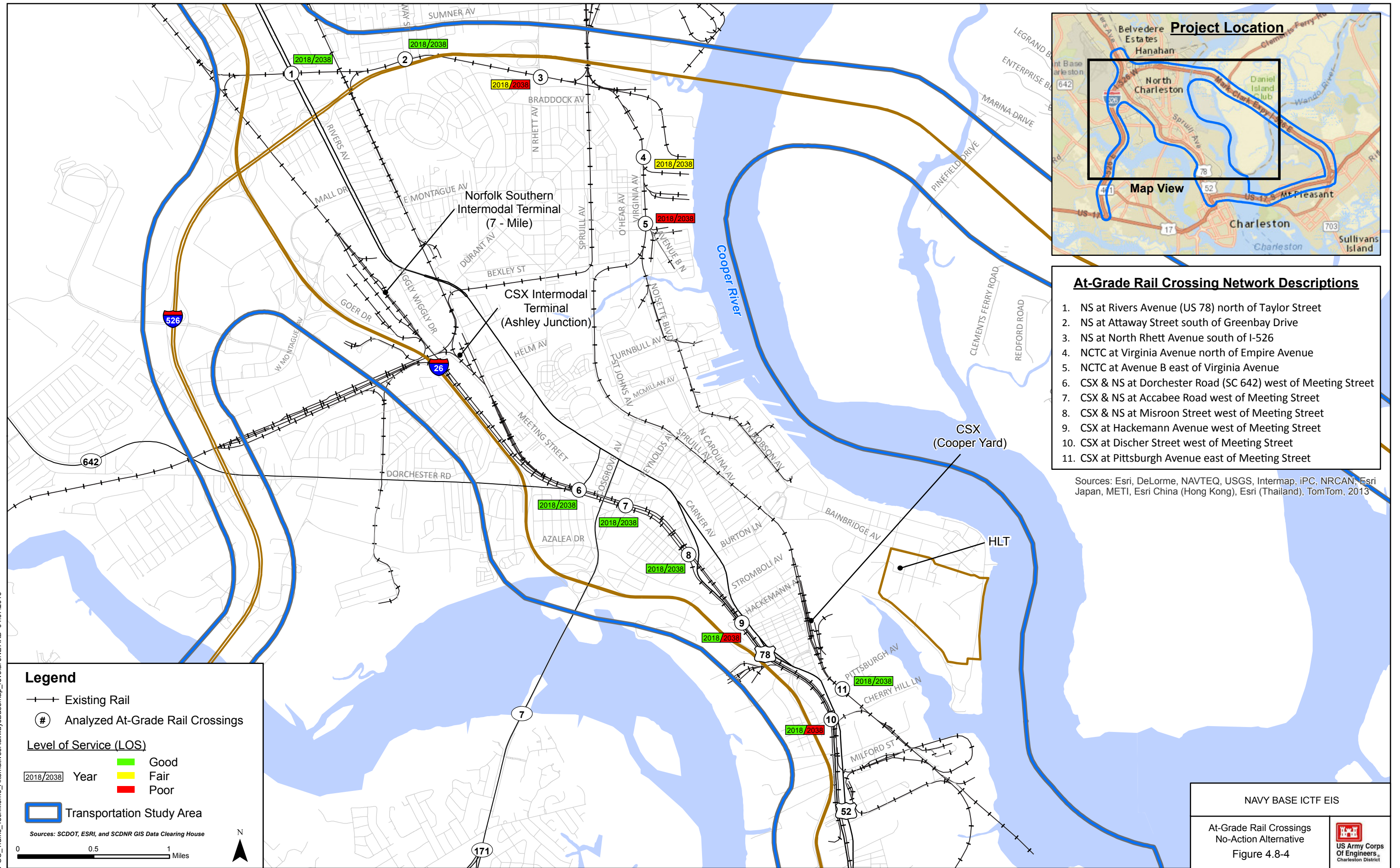






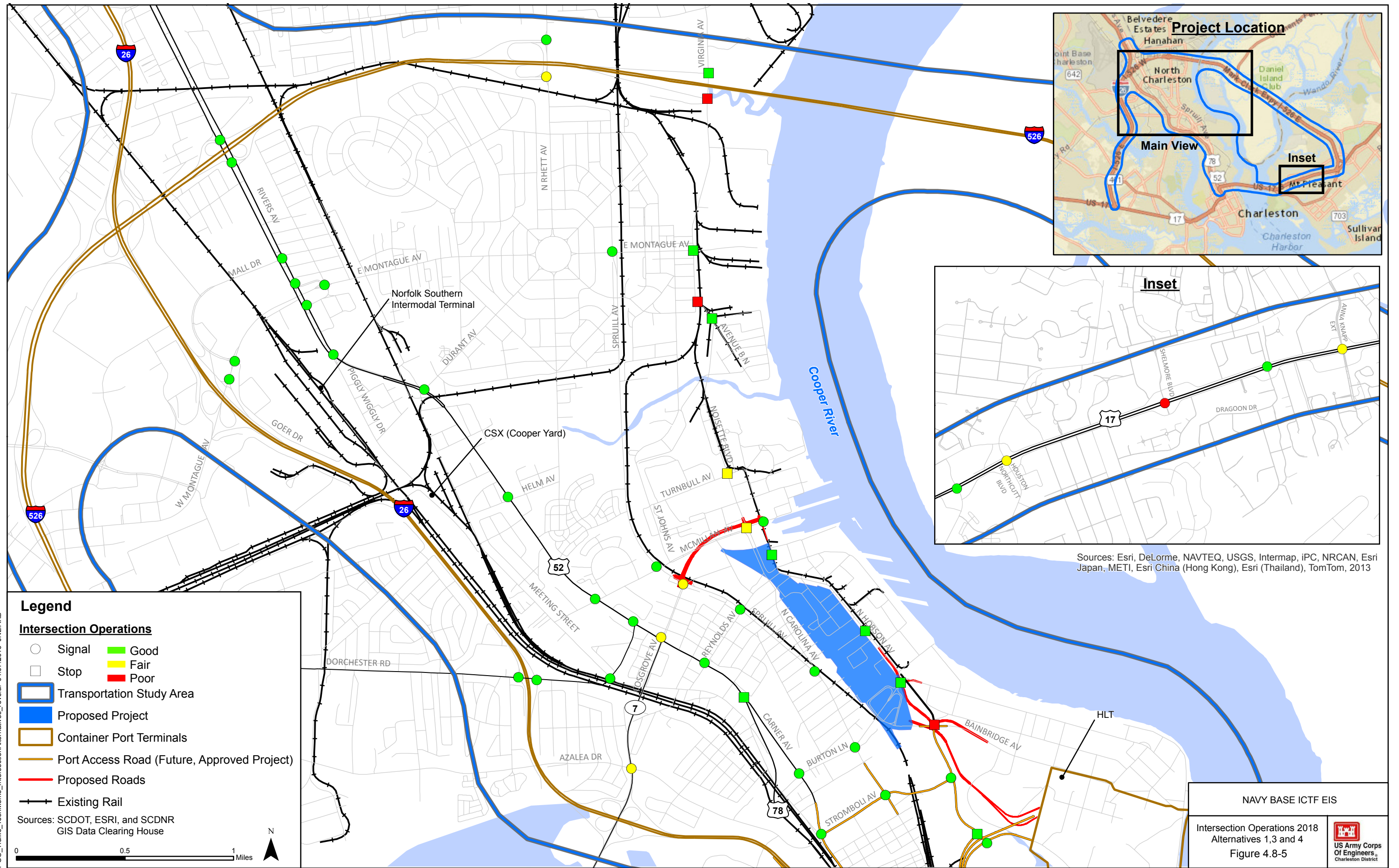






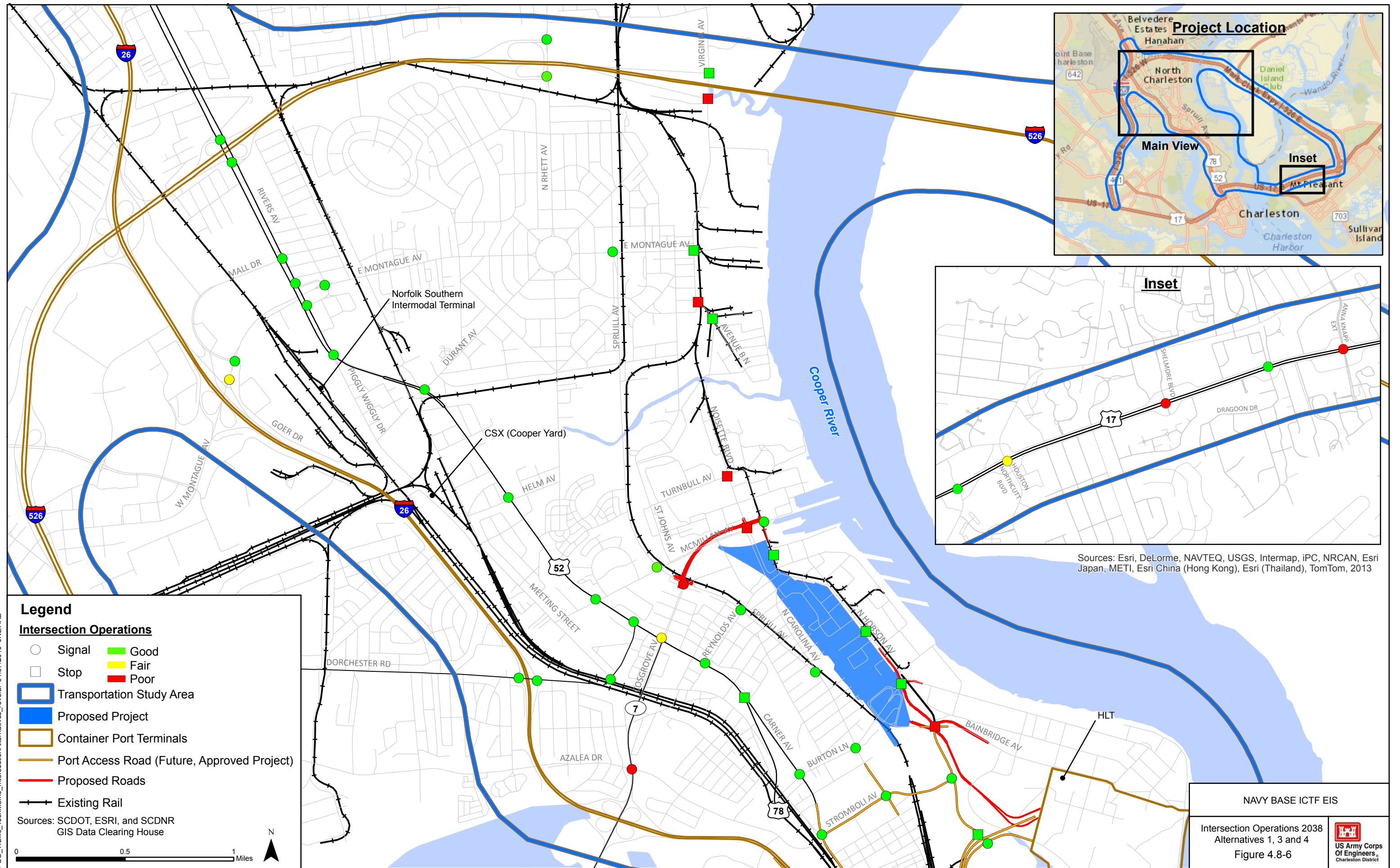






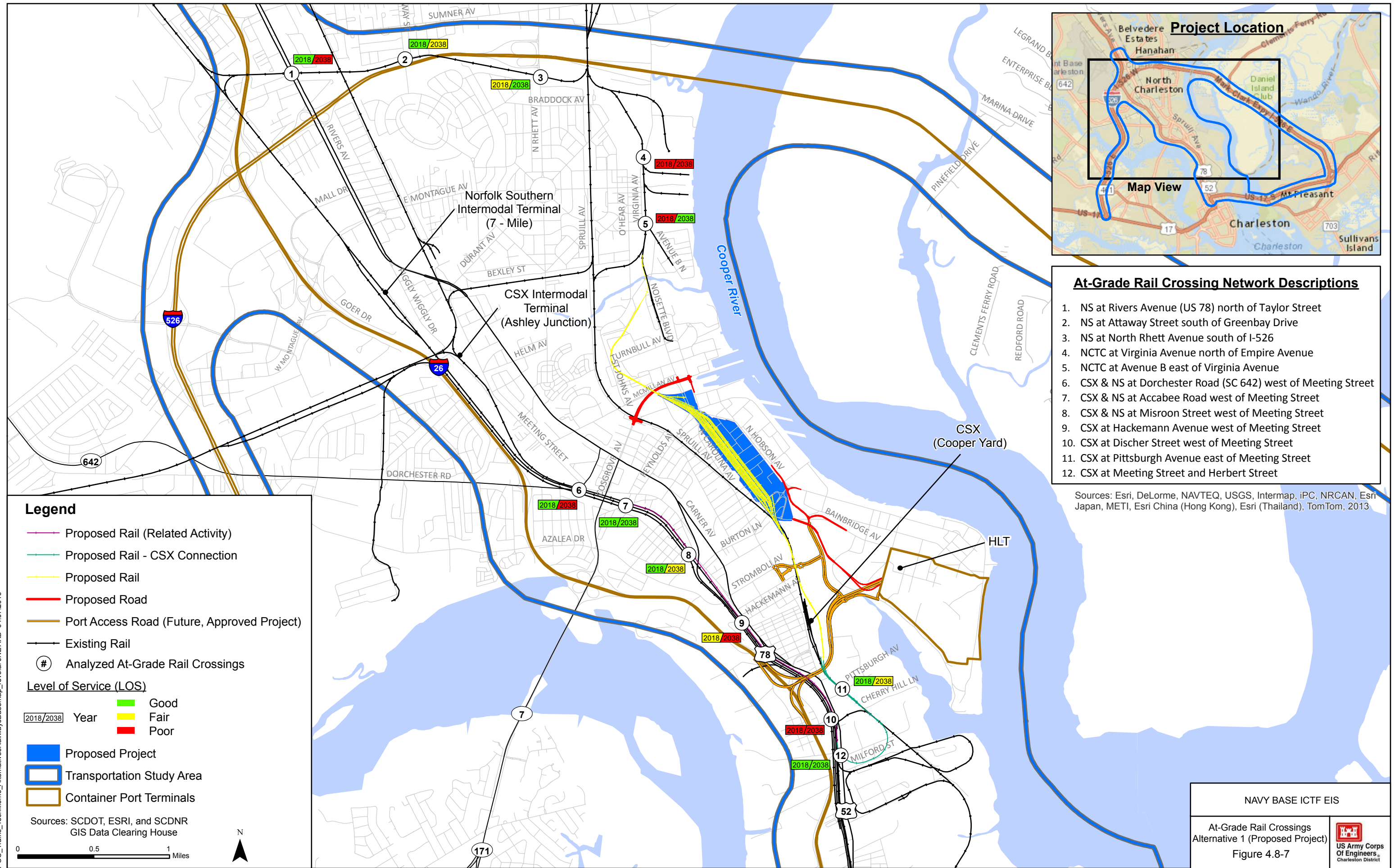






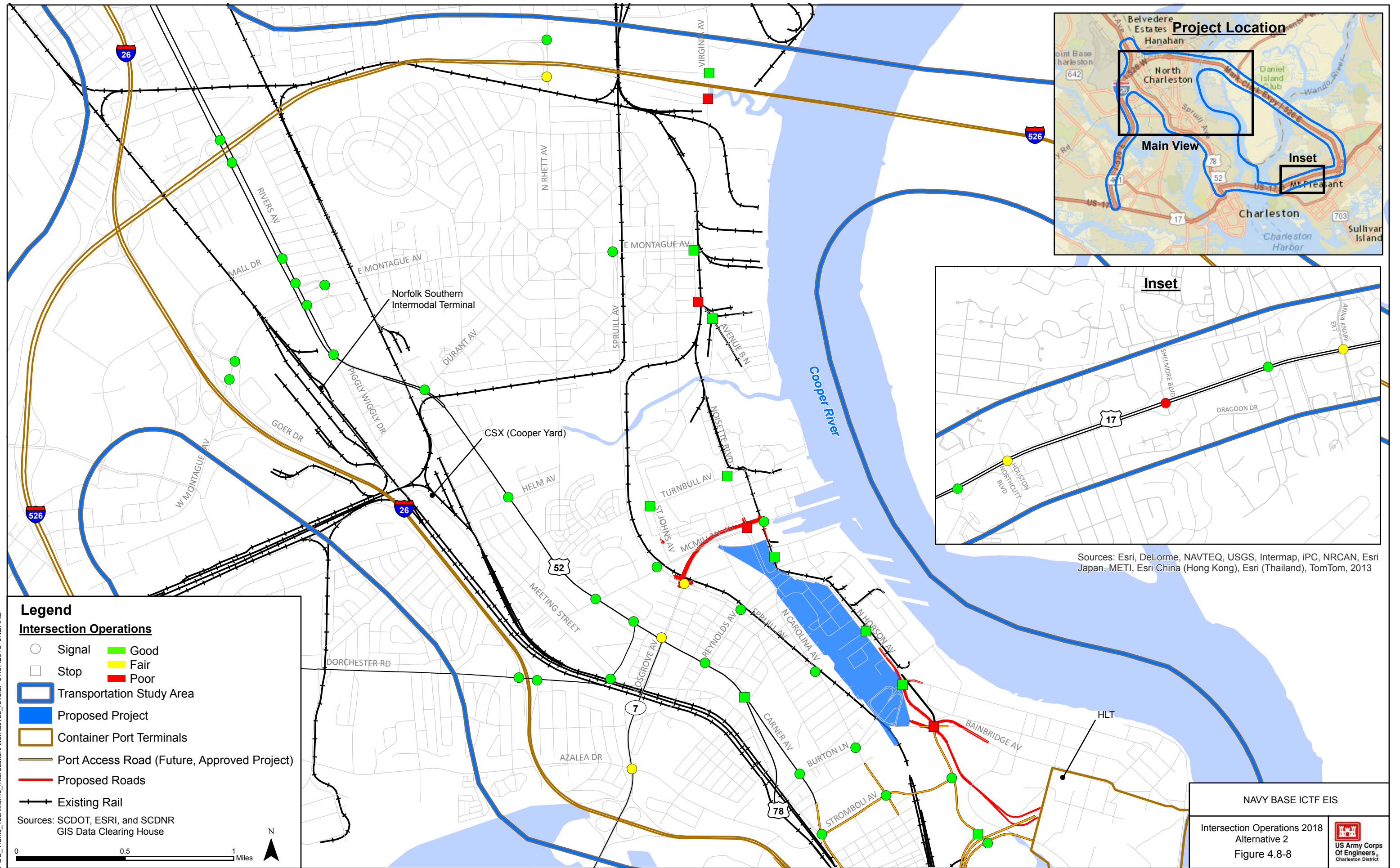






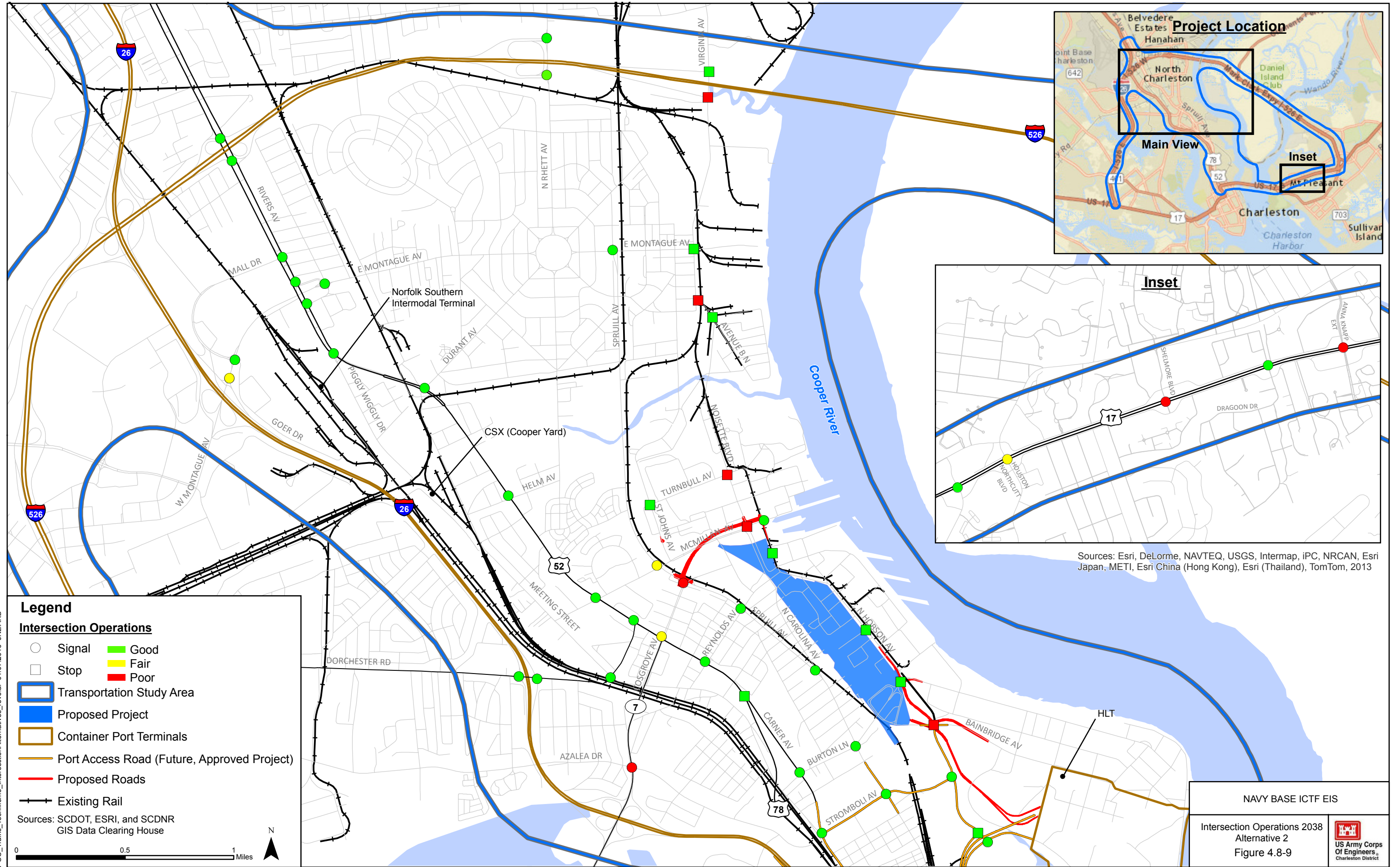






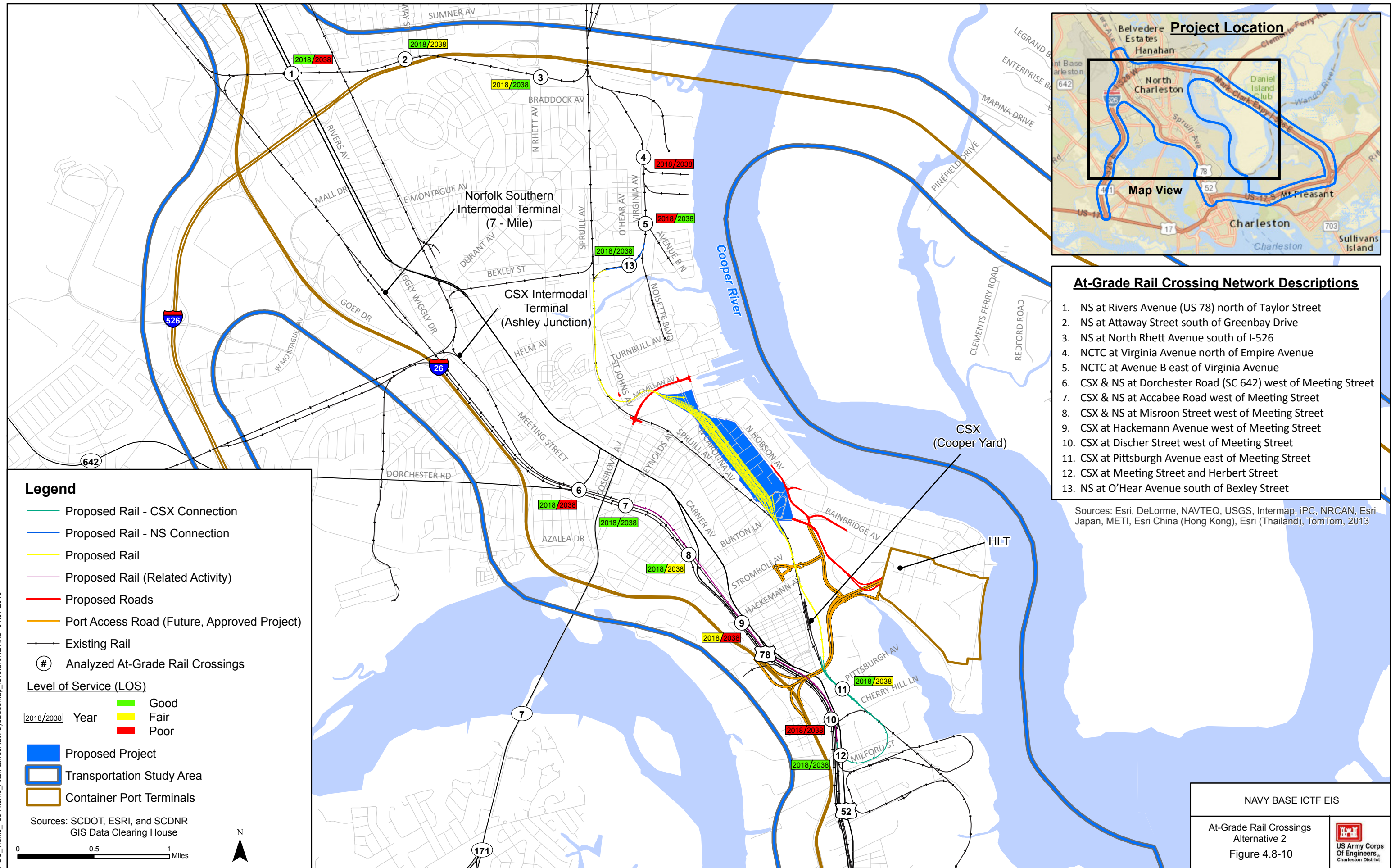






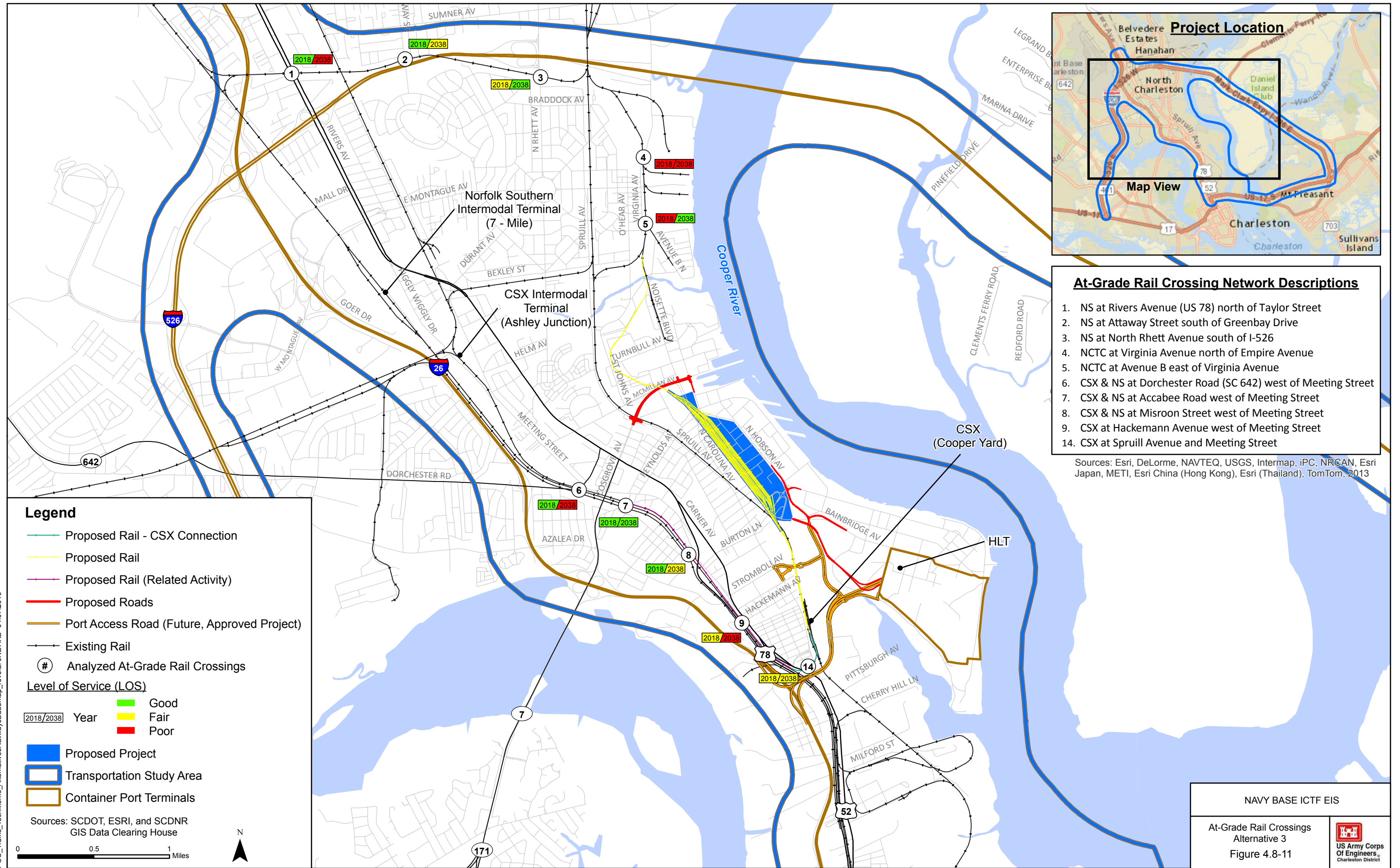






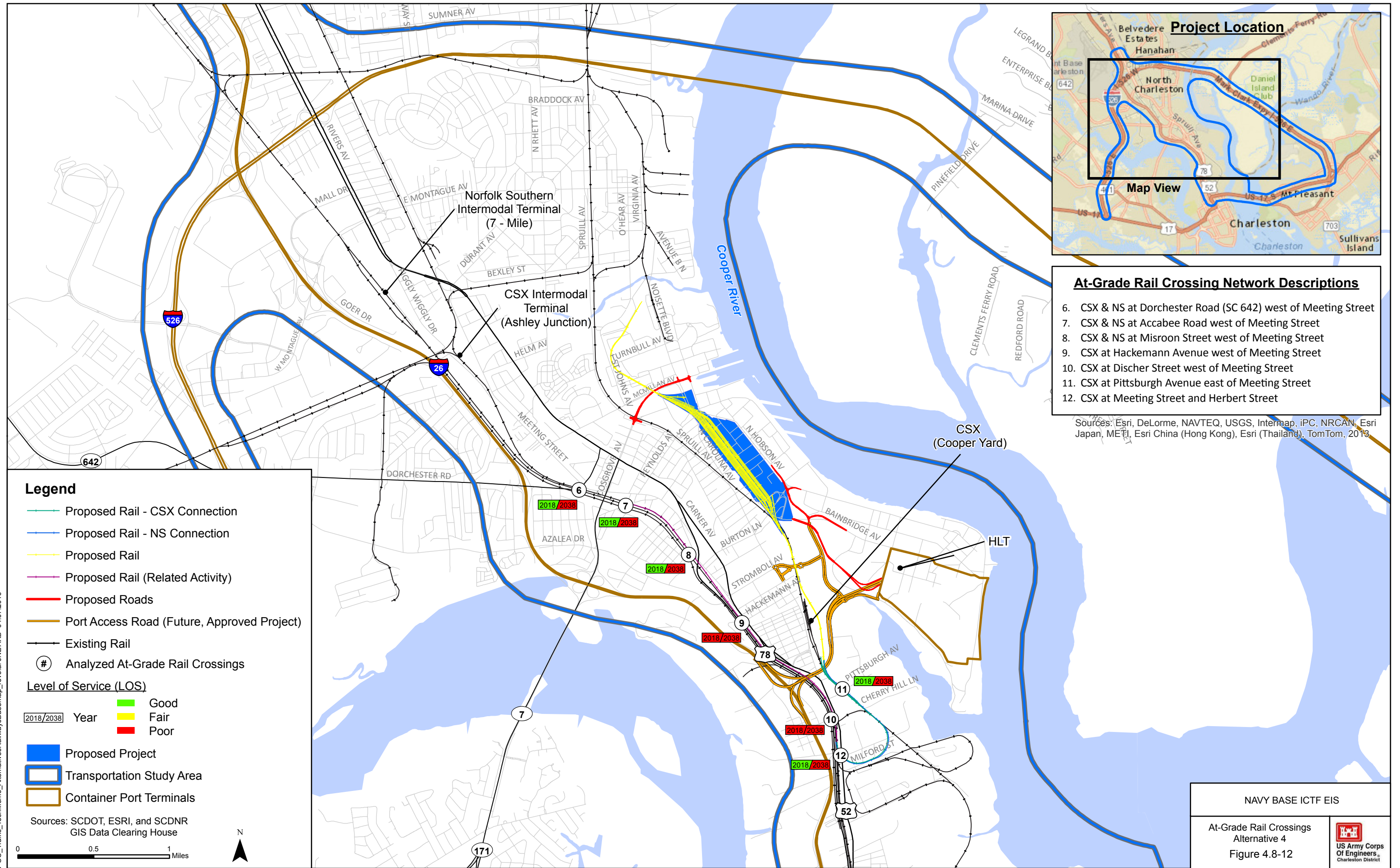






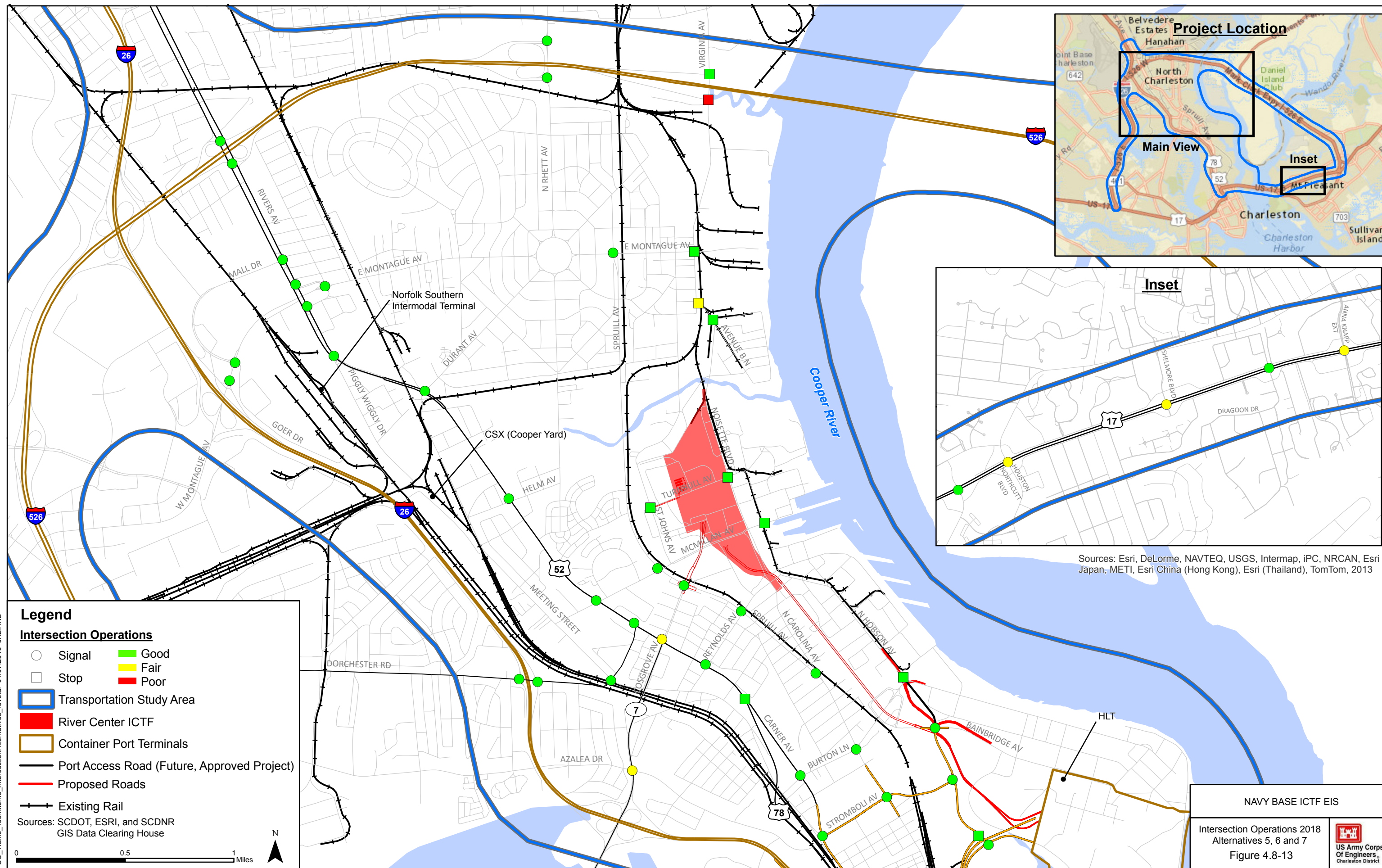






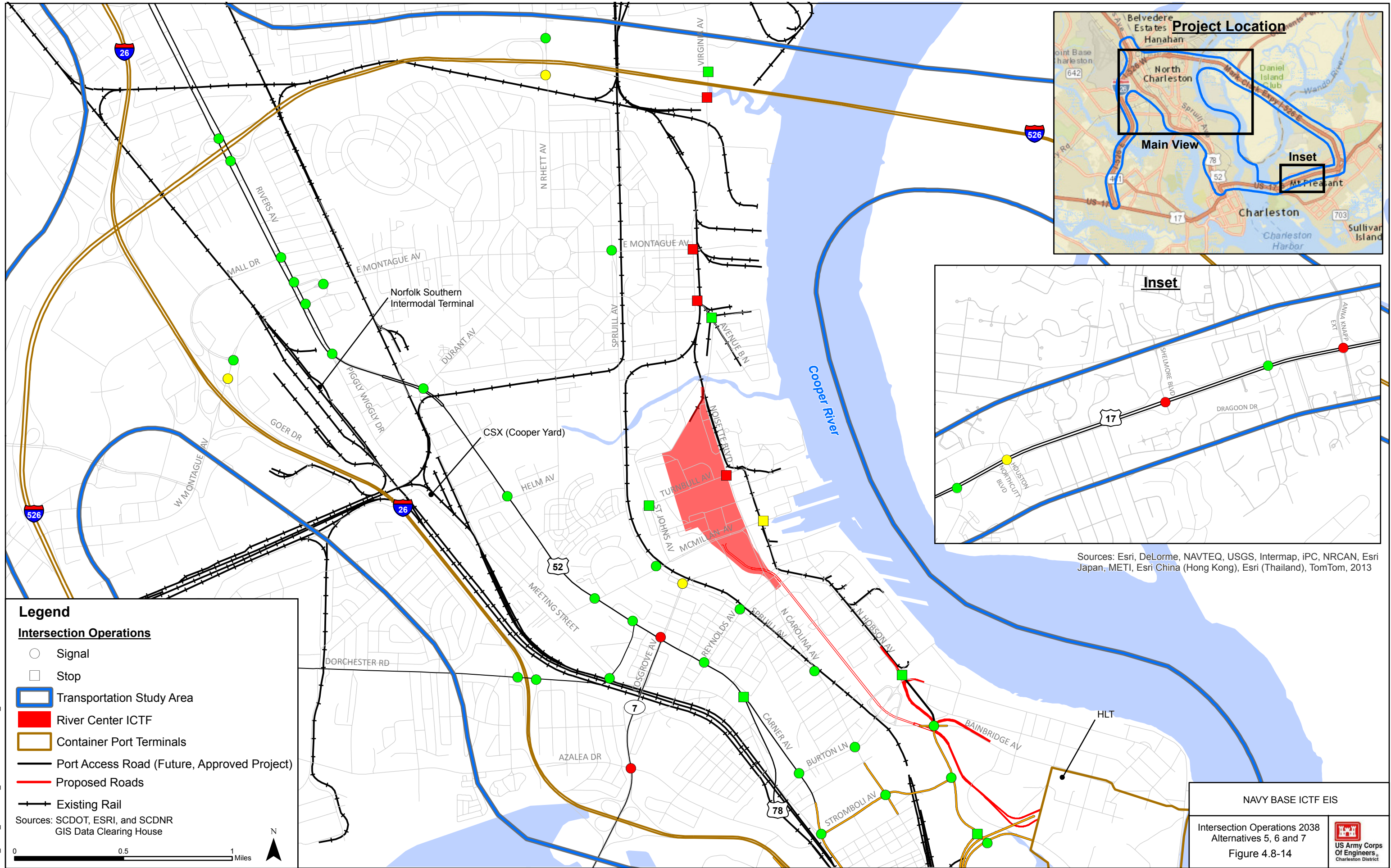






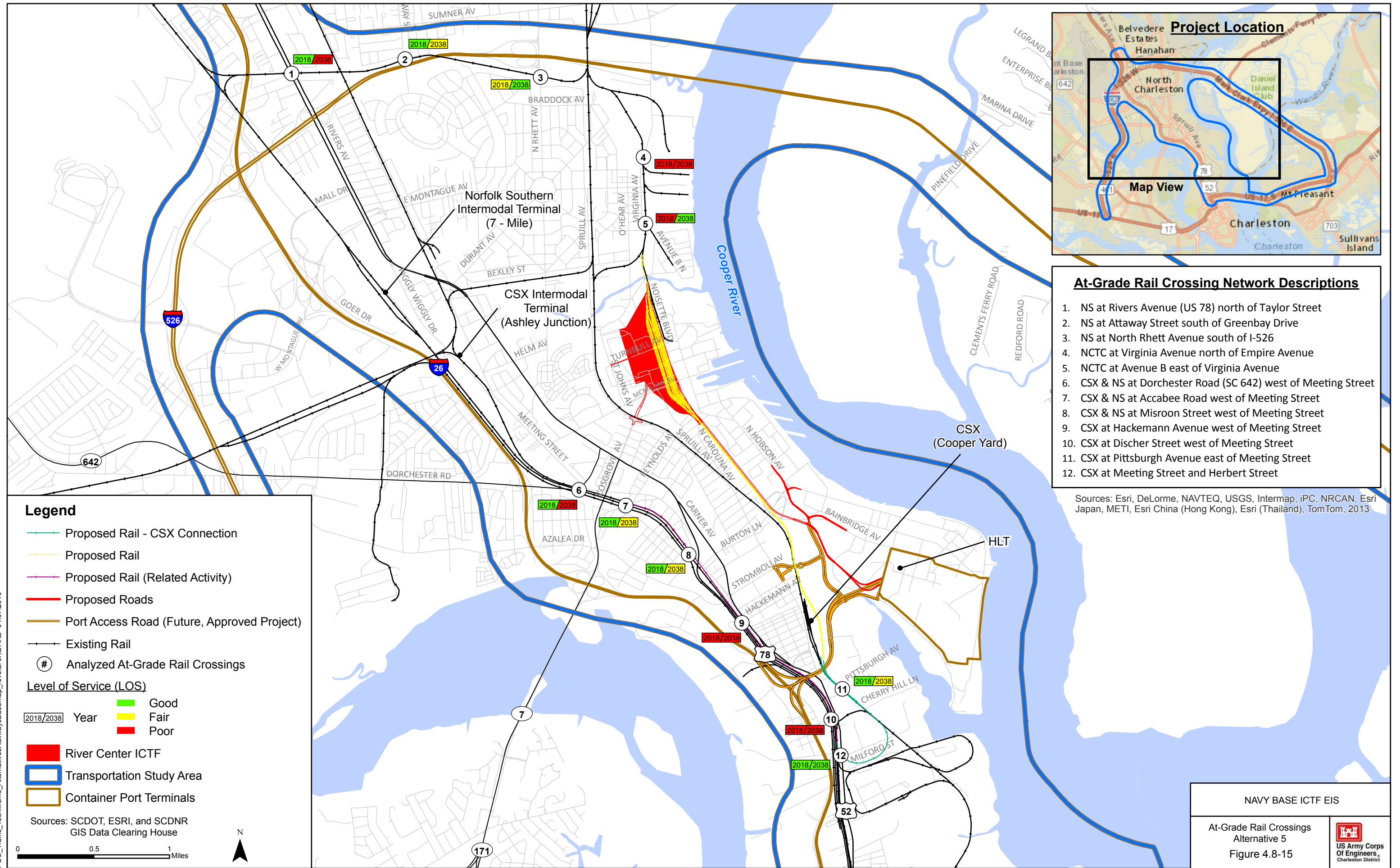






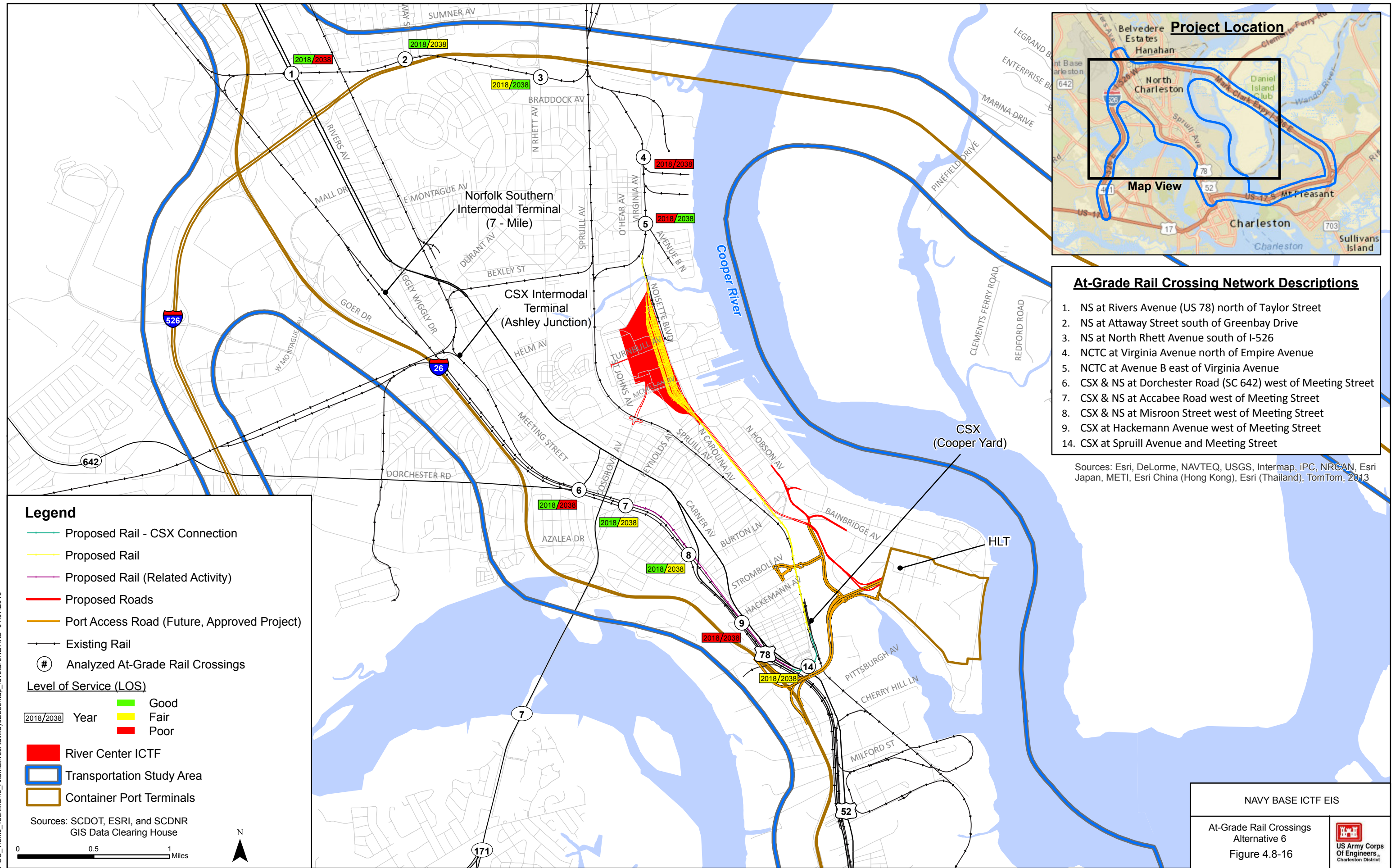






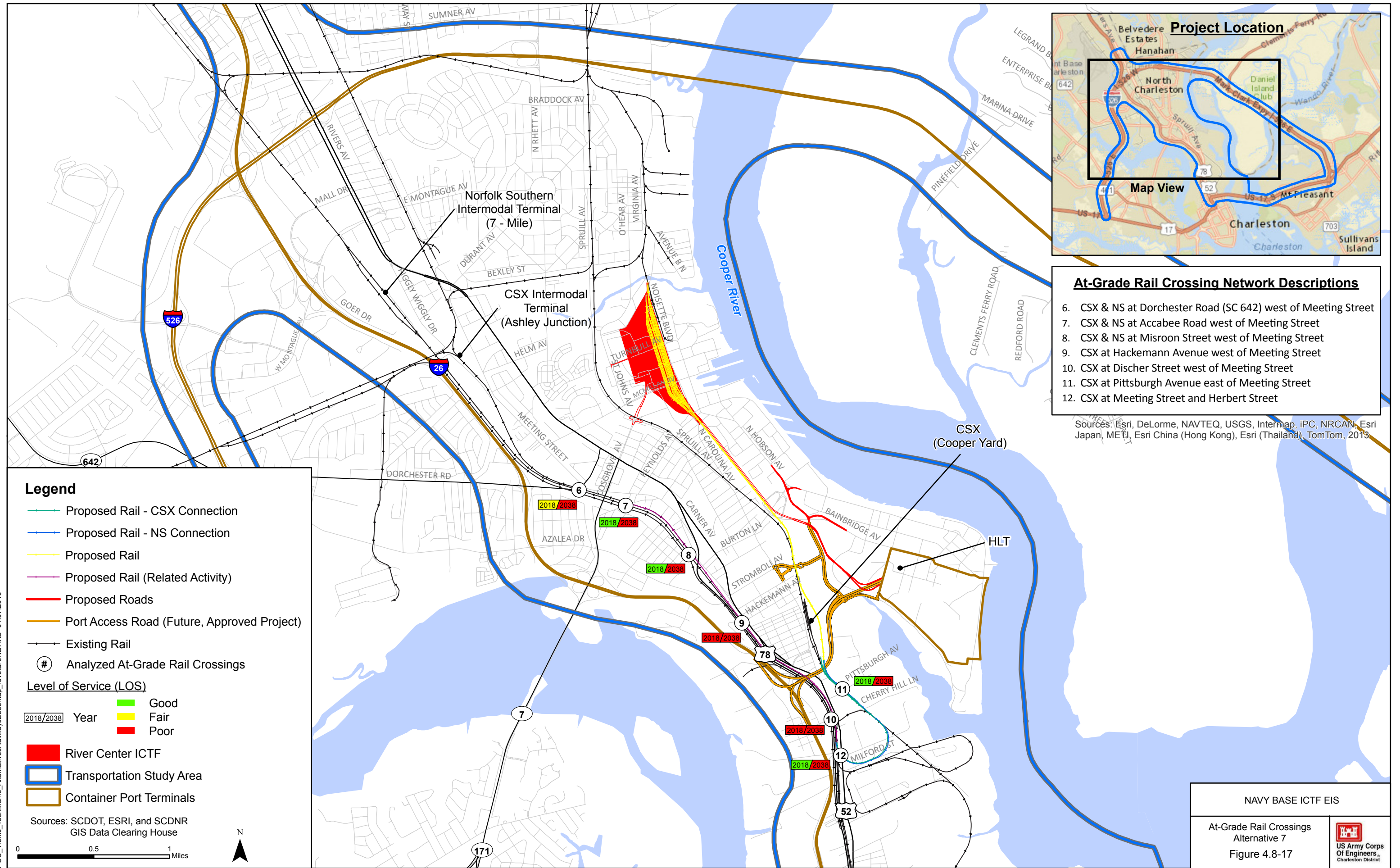
















## 4.9 LAND USE AND INFRASTRUCTURE

### 4.9.1 Methods and Impact Definitions

Impacts to land use and infrastructure in the study area were evaluated using literature review, impact analysis from other potential resources (such as noise and visual resources), local comprehensive plan and land development ordinance requirements, and best professional judgment. With respect to land use, the analysis focused on the potential for conflicts in and between land use districts as a result of construction and/or operation activities of the Proposed Project. Conflicts could include incompatibility with existing zoning and the adopted Comprehensive Plan, restricted access, and incompatible visual and/or noise impacts. If potential conflicts were present between existing zoning and the comprehensive plan, measures could be employed to bring zoning and land use into compliance.

With respect to infrastructure, the analysis focused on a review of the existing utility services and capacities within the study area, and the ability of these utilities to meet the new demand requirements resulting from the construction and operation of the Proposed Project.

Table 4.9-1 summarizes the impact definitions for land use and infrastructure impacts used in this analysis. Temporary impacts are considered to be those that would occur intermittently or less than 1 month; short-term impacts are considered to last between one to six months; long-term impacts last the duration of construction activities (anticipated to be two to three years); and permanent impacts are considered to continue indefinitely after construction and during the operation of the facility.

Table 4.9-1  
Impact Definitions, Land Use and Infrastructure

Level of Impact	Definition
<b>Negligible</b>	Compatible land uses (no change in designation required); no demolition of non-Palmetto Railways owned structures; interruption(s) of service due to construction and/or operation of the project for a duration of less than 12 hours.
<b>Minor</b>	Compatible land uses (no change in designation required); demolition of less than 10 non-Palmetto Railways owned structures, or no structures of special designation; interruption(s) of service due to construction and/or operation of the project for a duration of more than 12 hours but less than 24 hours.
<b>Major</b>	Incompatible land uses (e.g., change in land use designation is required); demolition of more than 10 non-Palmetto Railways owned structures or of any structures of special designation required; construction and/or operation activities of the proposed ICTF exceed capacities of utilities to serve the project, and/or routinely cause disruptions of service to residents and businesses within the study area for more than 24 hours.

## 4.9.2 No-Action Alternative

Under the No-Action Alternative, because these sites are primarily owned by Palmetto Railways, it is assumed that the project site and the River Center project site would eventually include mixed use and industrial land use, including rail-served warehousing and distribution. These uses would be consistent with the existing land uses (M-2, Heavy Industrial District, and Planned Development District), and would likely not require demolition of non-Palmetto Railways owned structures.

Future development activities would likely be of a smaller scale and intensity than the Proposed Project such that the existing design capacities of the serving utilities would be sufficient. There would not be a need to expand and/or improve the existing utilities infrastructure to the area.

For these reasons, impacts to land use and infrastructure under the No-Action Alternative are anticipated to be negligible.

## 4.9.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

### 4.9.3.1 Land Use and Zoning

#### ICTF Site

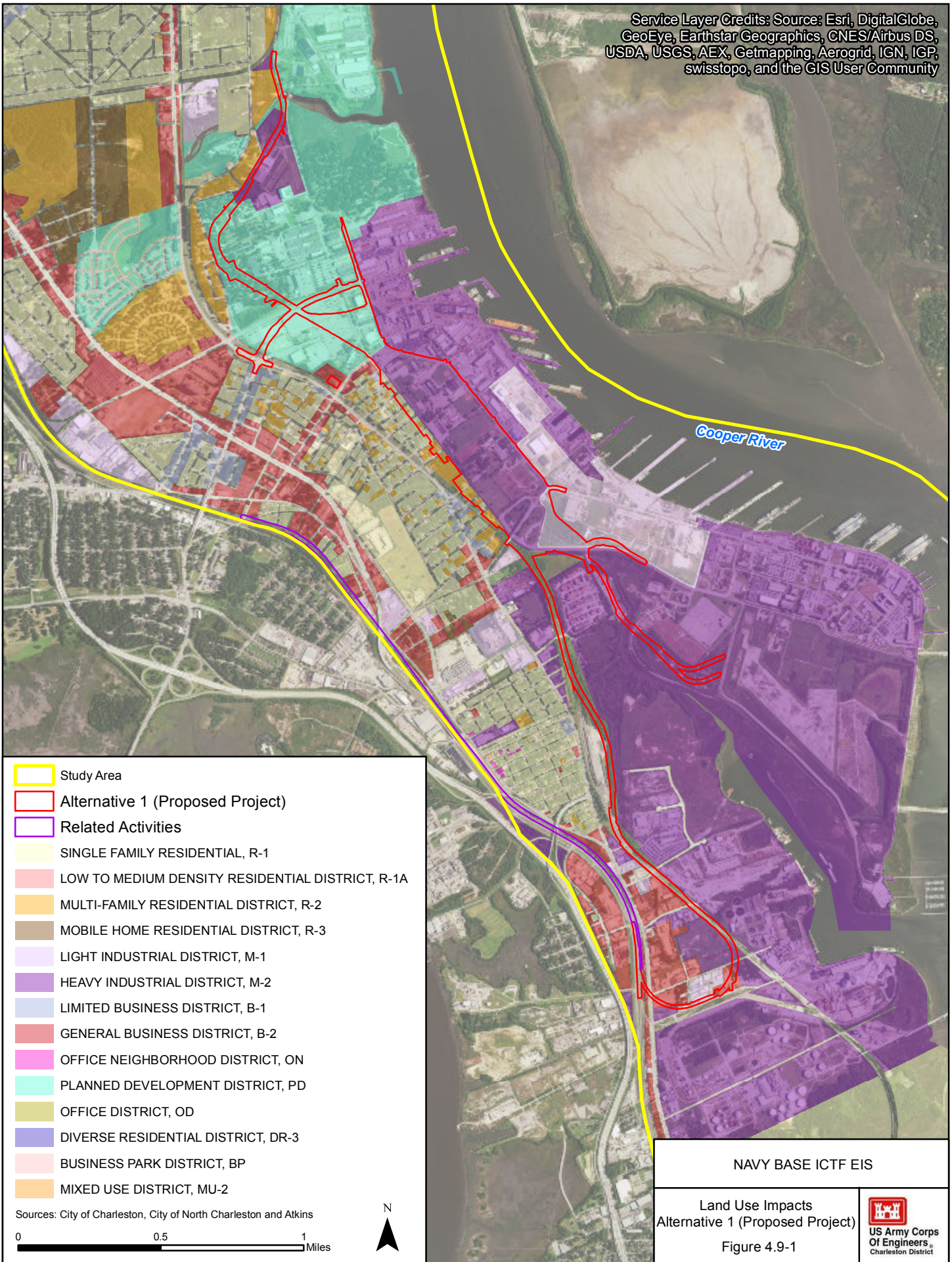
During the former Charleston Naval Base operations, the Chicora-Cherokee community was exposed to the heavy marine industrial activities conducted by the U.S. Navy within the base and along the Cooper River. After the base closure, the zoning classifications of M-1 (Light Industrial District) and M-2 (Heavy Industrial District) adjacent to the community remained in place (Figure 4.9-1). Consequently, the Chicora-Cherokee community has historically interfaced with the industrial activities on its eastern boundary.

The construction and operation of the Proposed Project would be consistent with the current zoning designation of M-2 (Heavy Industrial District) for the ICTF site. Container storage facilities are generally addressed as a conditional use under the M-2 (Heavy Industrial District) classification. However, the Future Land Use element of the adopted Comprehensive Plan for the City of North Charleston identifies portions of the project site as an Institutional future land use. Deviation from this future land use would require a Comprehensive Plan Amendment which would be a major impact to land use. The northern portion of the Proposed Project is currently zoned as (PD) Planned Development District, which has the flexibility for the industrial uses associated with the Proposed Project (Figure 4.9-1).

The western boundary of the ICTF site and noise berm would extend into the adjacent Chicora-Cherokee residential neighborhood which is currently zoned R-1 (Single Family Residential District)



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and R-2 (Multi-Family Residential District). It is anticipated that this action would require a zoning change and Comprehensive Plan amendment due to the conversion of the current residential zoning classification to an industrial classification and to bring the adopted Comprehensive Plan and accompanying Future Land Use Map (FLUM) into compliance, which would be a major impact to land use. For any proposed construction that is not consistent with the existing zoning code and adopted Comprehensive Plan, it would be incumbent upon Palmetto Railways to work with each municipality to go through the necessary processes to gain all administrative approvals related to land use to ensure compliance with all municipal land use regulations. It should be noted that in December 2012, the City of North Charleston and the South Carolina Division of Public Railways (now Palmetto Railways) entered into a Settlement Agreement and Release. Under the provisions of the Agreement, “City staff will support all reasonable rezoning, permitting and other administrative approvals necessary for implementation of the ICTF and associated railroad lines as well as any other activities required to facilitate the movement of cargo to and from the Port of Charleston” (Section II(C)(2), Case No. 2011-CP-10-491 through 494, 2011-CP-10-5550, and 2011-CP-10-3147). Because of this agreement, it is anticipated this conditional use will be successfully negotiated and approved.

### Roadway/Rail Improvements

Proposed roadway and rail improvements south of the ICTF site would occur on lands currently classified as M-1 (Light Industrial District) and M-2 (Heavy Industrial District) within the City of North Charleston (Figure 4.9-1). These infrastructure improvements would be consistent with the respective zoning district use classifications. Near the vicinity of Pittsburgh Avenue, zoning jurisdiction changes to the City of Charleston and is thus subject to the zoning regulations of the City of Charleston. The new track connection in the vicinity of Milford Street would traverse land currently zoned as GB (General Business District), HI (Heavy Industrial District), LI (Light Industrial District) and BP (Business Park District) (Figure 4.9-1).

Proposed roadway and rail improvements north of the ICTF site would occur on land currently classified as M-2 (Heavy Industrial District) and PD (Planned Development District). These infrastructure improvements would be consistent with their respective zoning district use classifications.

### Demolition of Structures

Construction of the Proposed Project would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the ICTF site, this construction would cause the demolition of approximately 100 structures. Additional off-site roadway and rail improvements would cause the demolition of approximately approximately 50 structures. The demolition of more than 10 non-Palmetto Railways owned structures would result in a major impact to land use. The community and resources and structures of special designation that



would be lost as a result of the Proposed Project are detailed in Section 4.16 (Socioeconomics and Environmental Justice) and Section 4.10 (Cultural Resources), respectively.

The Proposed Project would result in ROW acquisitions that would result in the relocation of approximately 106 residential units from the Chicora-Cherokee neighborhood. Any person(s) whose property needs to be acquired as a result of the Proposed Project would be compensated in accordance with the U.S. Constitution and the Uniform Act of 1970, as amended (See Chapter 8 Relevant Laws, Regulations, and Executive Orders).

#### **4.9.3.2 Infrastructure and Utilities**

Utility infrastructure and services are currently available in the vicinity of the project site; however utilities would have to be extended to serve the Proposed Project. Existing utility systems, such as potable water, electricity, sanitary sewer, solid waste, and telecommunications, would provide services to the project site. Demand for potable water and sanitary/solid waste collection would be generated by ICTF employees and occasional visitors during operation of the proposed ICTF. The operation of the facility would not require industrial water usage, nor would it generate sanitary or solid waste other than the amount relating to employees. Provision of services to the project site would be subject to contract agreements with the respective utilities, and, in some cases (e.g., electrical), relocation and improvements to existing infrastructure.

##### **4.9.3.2.1 Electricity**

Estimated usage of electricity for the Proposed Project is 18 million kilowatt hours/year. Electricity to the project site is to be provided by a partnership between the South Carolina Electric and Gas Company (SCE&G), a primary subsidiary of SCANA, and Santee-Cooper. Both electrical utilities have the capacity to serve the project site; however, peak service demands from the five electrical cranes on the project site would require upgrades to the local infrastructure. SCE&G would serve the startup and future electrical demands for the ICTF from their onsite substation which is located north of the truck gate on North Hobson Avenue. Existing utility lines for Santee-Cooper within the project site would be removed, and new electrical lines would be placed to serve the electrical needs of the ICTF. Relocation of electrical infrastructure during construction efforts could result in an interruption of service to local area residents and businesses for less than 12 hours.

##### **4.9.3.2.2 Natural Gas**

SCE&G also provides natural gas to retail customers through its extended transportation network in the Charleston Area. No natural gas service is anticipated to be required for the Proposed Project.

#### 4.9.3.2.3 *Communications*

SCANA Communications provides fiber optic telecommunications, Ethernet, and data center facilities to the project site. Construction and operation of the ICTF would require relocation or removal of communication infrastructure from SCANA Communication. The provision of telecommunications and other services such as Internet would be accomplished with local connections to the SCANA communication network. Relocation of communication infrastructure during construction efforts could result in an interruption of service to local area residents and businesses for less than 12 hours.

#### 4.9.3.2.4 *Potable Water*

The estimated usage for water for the Proposed Project is 264,625 gallons/year, however there would be no impact on Charleston Water System (CWS) capacity or infrastructure to provide potable water and fire protection water flow for construction and operation of the Proposed Project. The project site is currently served by a 12-inch ductile iron potable water and fire serve pipeline that runs along the eastern right of way of North Hobson Avenue. This pipeline is adequate to provide the requirement of the project at build-out and full employment. External water use would be limited to landscape irrigation during dry months of the year. Fire protection is currently provided from hydrants spaced at 300 to 600 feet intervals along North Hobson Avenue. CWS maintains reserves for fire flow capacity and water pressure to serve the fire protection needs within their service area, which includes the location of the Proposed Project.

There is currently a network of smaller potable water lines, ranging in size from 4 to 8 inches, within the project site. These lines would be adapted to serve the respective project, abandoned in place, and/or rerouted to continue service to the surrounding area. In addition, certain pipelines, including a 48-inch transmission line along Spruill Avenue, may be impacted by realignment of roads and the extension of rail lines within the study area, both north and south of the project site. Realignment of these water lines during construction efforts could result in an interruption of service to local area residents and businesses for less than 12 hours.

#### 4.9.3.2.5 *Wastewater*

Wastewater collection and treatment services to the study area are provided by the North Charleston Sewer District. Treatment is performed at the Felix Davis Waste Water Treatment Plant (WWTP), which is designed to a 27 MGD capacity. The plant currently operates at an average of 15 MGD, leaving 12 MGD capacity for peak day loads and growth. As a result, the plant capacity is more than sufficient to accommodate the estimated 725 GPD flow from the Proposed Project, and there would be no impact to the North Charleston Sewer District from operation of the Proposed Project.

Two wastewater pump stations are located on the project site. Wastewater flow from these stations is accommodated by an existing 30-inch gravity and 20-inch force main. The North Charleston Sewer District is coordinating with Palmetto Railways to relocate the existing on-site pump station to

accommodate the Proposed Project. Sanitary sewer lines currently extend throughout the project site. Lines of various sizes also extend along roads slated for removal and/or improvements, as well as under proposed railroad rights-of-way. These lines may be rerouted and/or abandoned in place to accommodate the construction of the Proposed Project. Realignment of these sanitary sewer lines during construction efforts could result in an interruption of service to local area residents and businesses for less than 12 hours.

#### **4.9.3.2.6      *Solid Waste***

The City of North Charleston Sanitation Division performs solid waste collection and disposal. Daily/weekly solid waste collection is provided along an established route in the vicinity of the project site by both the Sanitation Division and private waste management firms. Thus, there are sufficient public and private collection and disposal services available to serve the ICTF. Disposal of domestic solid waste in the region is accommodated at the Spring View landfill, which projects a 125-year remaining capacity based on current disposal rates. Spring View landfill currently follows all State and local standards for sanitary landfills. Commercial and industrial businesses must arrange for private collection and disposal of solid waste at the Spring View landfill, as well as hazardous and/or non-hazardous solid waste that would require special handling and disposal. Approximately 263,000 cubic yards of solid waste would be generated during the construction of the ICTF, all of which would be disposed of at the Spring View landfill. All State and local standards for solid waste disposal would be followed during construction and operation. As a result, there would be no impact from the collection and disposal of solid wastes from the Proposed Project.

For the reasons discussed above, the Proposed Project would have major impacts to land use and demolition of structures, and negligible impacts to infrastructure.

### **4.9.4            *Alternative 2: Proposed Project (CSX – South via Milford / NS – North via S-line)***

#### **4.9.4.1        *Land Use and Zoning***

##### ***ICTF Site***

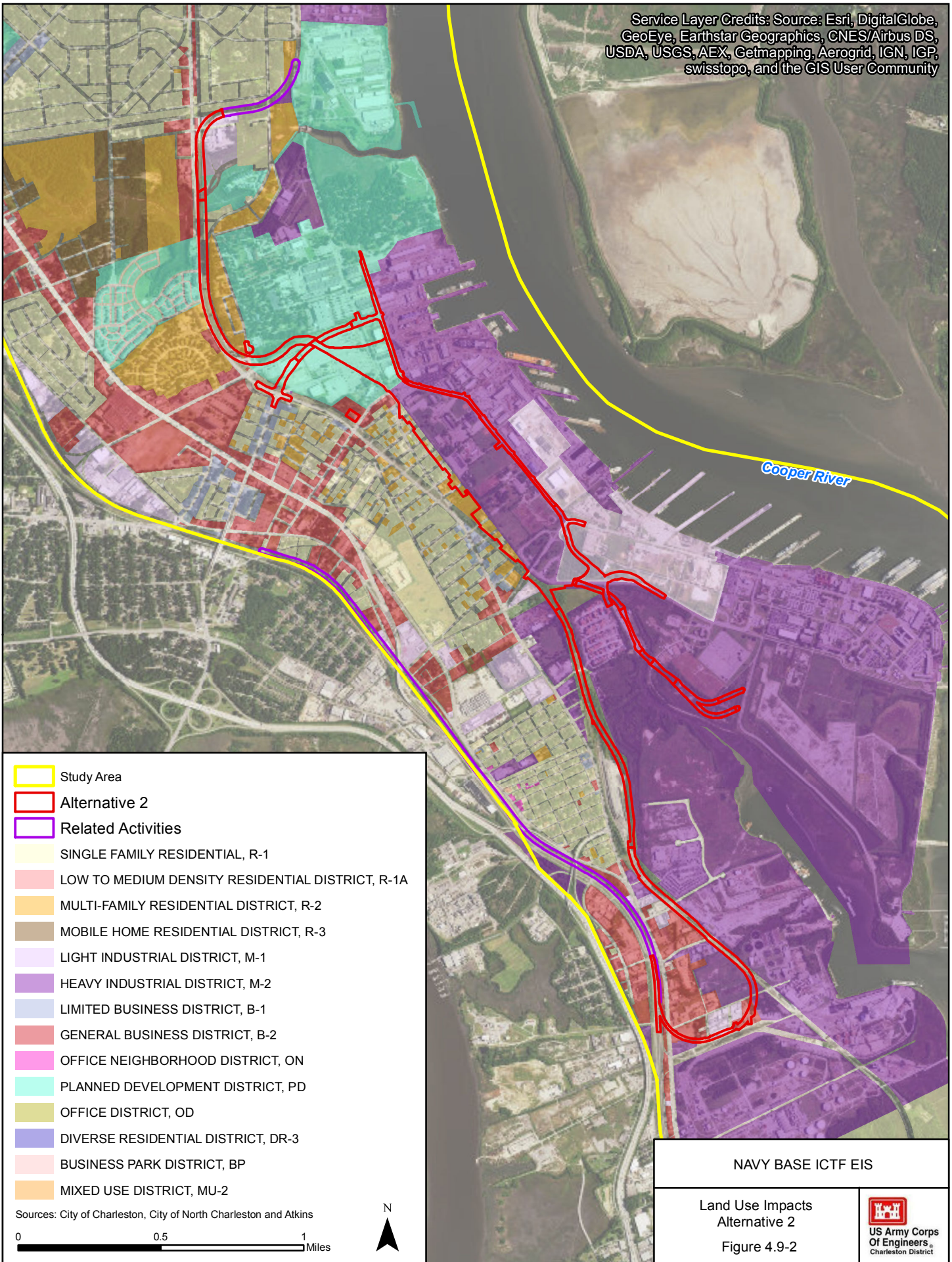
Under Alternative 2, land use and zoning impacts related to the project site (Figure 4.9-2) would be similar to those described for the Proposed Project. This action would require zoning changes and a Comprehensive Plan amendment.

##### ***Roadway/Rail Improvements***

Under Alternative 2, land use and zoning impacts related to roadway and rail improvements (Figure 4.9-2) would be similar to those described for the Proposed Project.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



## Demolition of Structures

Construction of Alternative 2 would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the project site, this construction would cause the demolition of approximately 100 structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 20 structures.

### 4.9.4.2 Infrastructure and Utilities

Infrastructure and utility requirements and impacts under Alternative 2 would be similar to those described for the Proposed Project. Any interruption of service to local area residents and businesses would be less than 12 hours.

For the reasons discussed above, Alternative 2 would have major impacts to land use and demolition of structures, and negligible impacts to infrastructure.

## 4.9.5 Alternative 3: Proposed Project (CSX – South via Kingsworth / NS – North via Hospital)

### 4.9.5.1 Land Use and Zoning

#### ICTF Site

Under Alternative 3, land use and zoning impacts related to the project site (Figure 4.9-3) would be similar to those described for the Proposed Project. This action would require zoning changes and a Comprehensive Plan amendment.

#### Roadway/Rail Improvements

Under Alternative 3, land use and zoning impacts related to roadway and rail improvements (Figure 4.9-3) would be similar to those described for the Proposed Project.

## Demolition of Structures

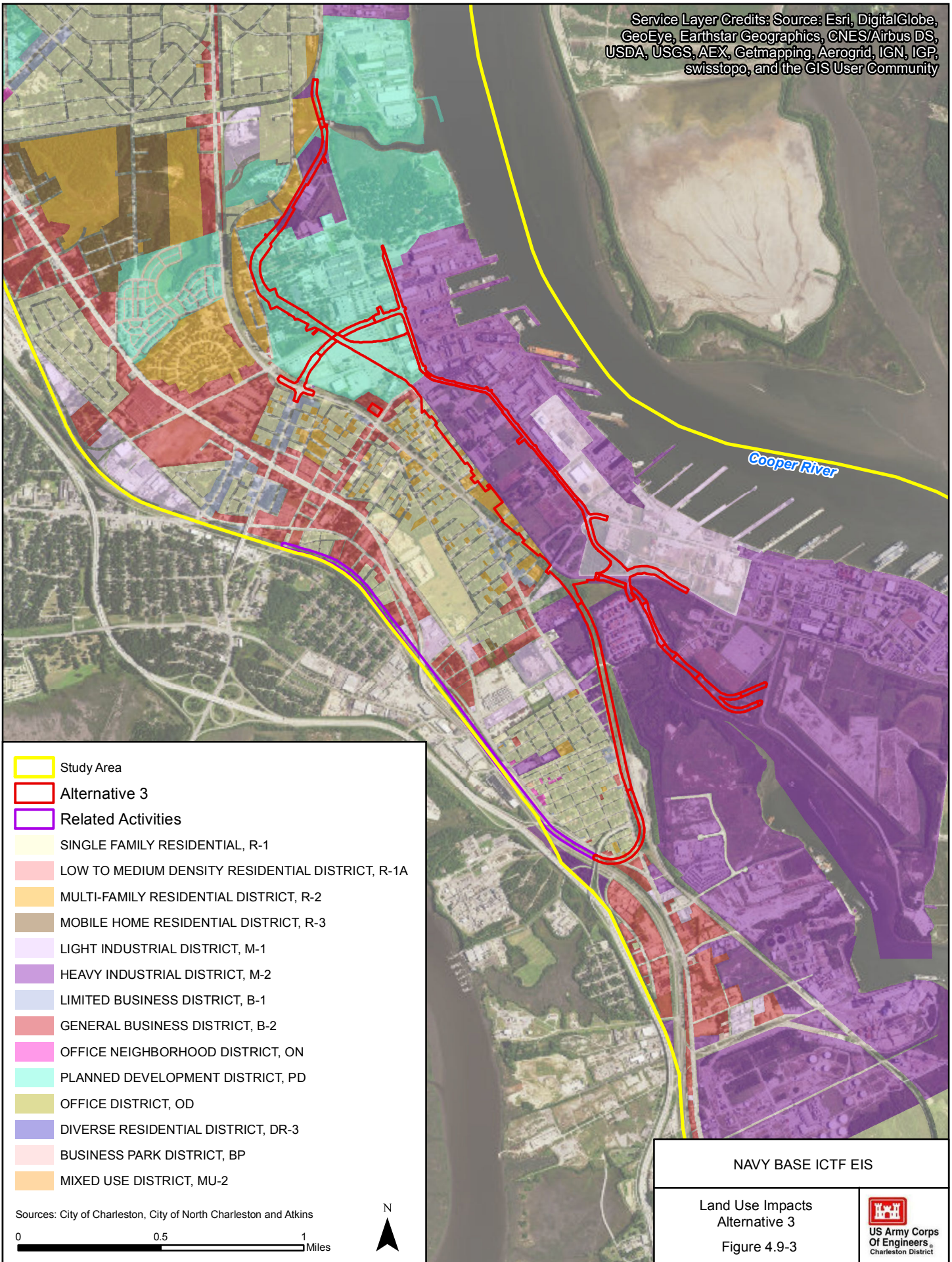
Construction of Alternative 3 would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the ICTF site, this construction would cause the demolition of approximately 100 structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 40 structures.

### 4.9.5.2 Infrastructure and Utilities

Infrastructure and utility requirements and impacts under Alternative 3 would be similar to those described for the Proposed Project. Any interruption of service to local area residents and businesses would be less than 12 hours.



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For the reasons discussed above, Alternative 3 would have major impacts to land use and demolition of structures, and negligible impacts to infrastructure.

## **4.9.6 Alternative 4: Proposed Project (CSX & NS – South via Milford)**

### **4.9.6.1 Land Use and Zoning**

#### **ICTF Site**

Under Alternative 4, land use and zoning impacts related to the project site (Figure 4.9-4) would be similar to those described for the Proposed Project. This action would require zoning changes and a Comprehensive Plan amendment.

#### **Roadway/Rail Improvements**

Under Alternative 4, land use and zoning impacts related to roadway and rail improvements (Figure 4.9-4) would be similar to those described for the Proposed Project.

#### **Demolition of Structures**

Construction of Alternative 4 would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the ICTF site, this construction would cause the demolition of approximately 100 structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 50 structures.

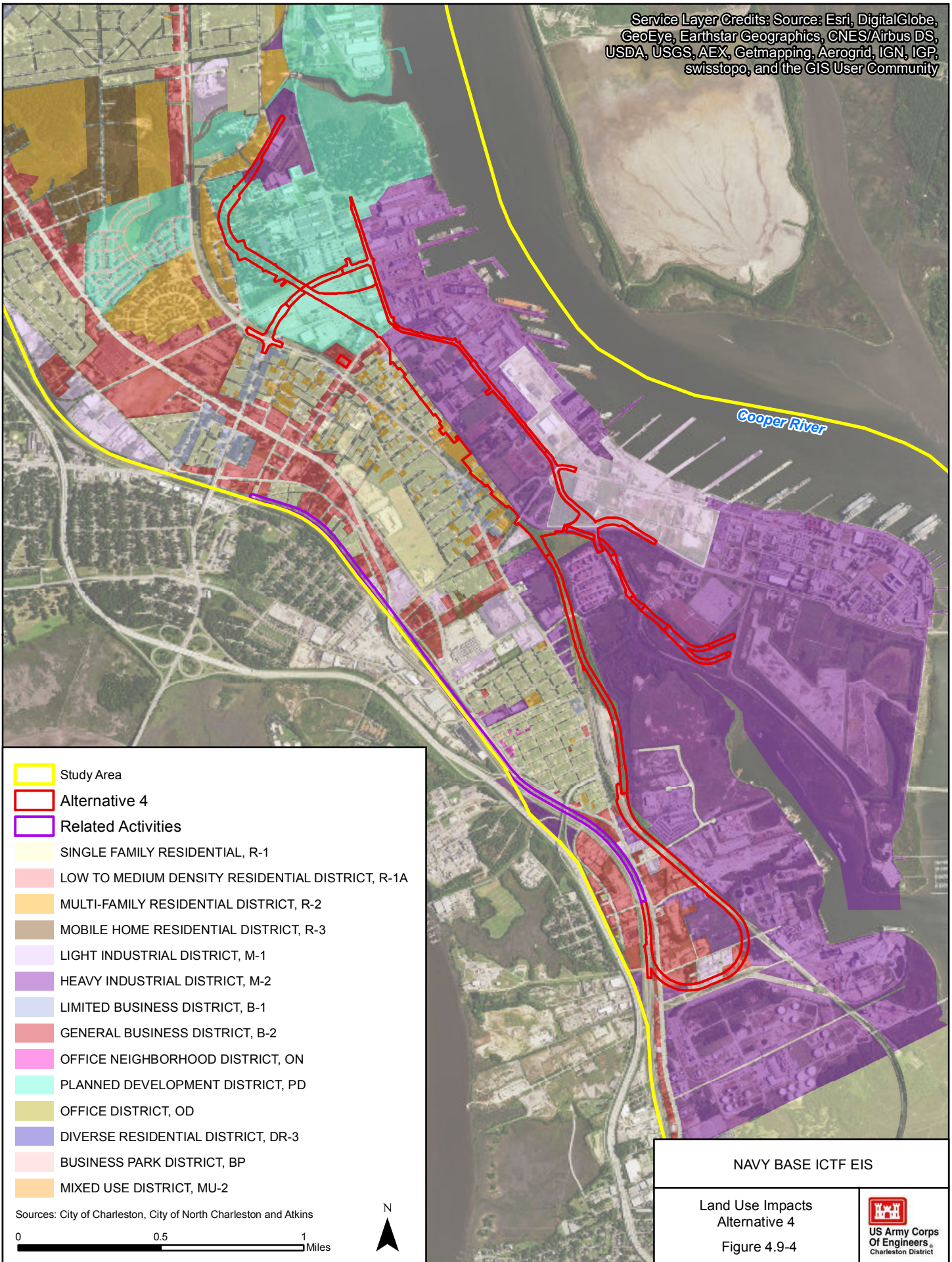
### **4.9.6.2 Infrastructure and Utilities**

Infrastructure and utility requirements and impacts under Alternative 4 would be similar to those described for the Proposed Project. Any interruption of service to local area residents and businesses would be less than 12 hours.

For the reasons discussed above, Alternative 4 would have major impacts to land use and demolition of structures, and negligible impacts to infrastructure.



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## **4.9.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)**

### **4.9.7.1 Land Use and Zoning**

#### **River Center Project Site**

Under Alternative 5, the construction and operation of the River Center project site (Figure 4.9-5) would be consistent with the current zoning classifications of PD (Planned Development District) and M-2 (Heavy Industrial District).

#### **Roadway/Rail Improvements**

Under Alternative 5, land use and zoning impacts related to roadway and rail improvements (Figure 4.9-5) would be similar to those described for the Proposed Project.

#### **Demolition of Structures**

Construction of Alternative 5 would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the River Center project site, this construction would cause the demolition of approximately 48 structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 20 structures.

Alternative 5 would result in the relocation of 62 residences and 18 commercial properties, including the West Yard Lofts low-income housing complex and the Lowcountry Innovation Center, which houses more than 15 companies. Any person(s) whose property needs to be acquired as a result of the Proposed Project would be compensated in accordance with the U.S. Constitution and the Uniform Act of 1970, as amended (see Chapter 8, Relevant Laws, Regulations, and Executive Orders).

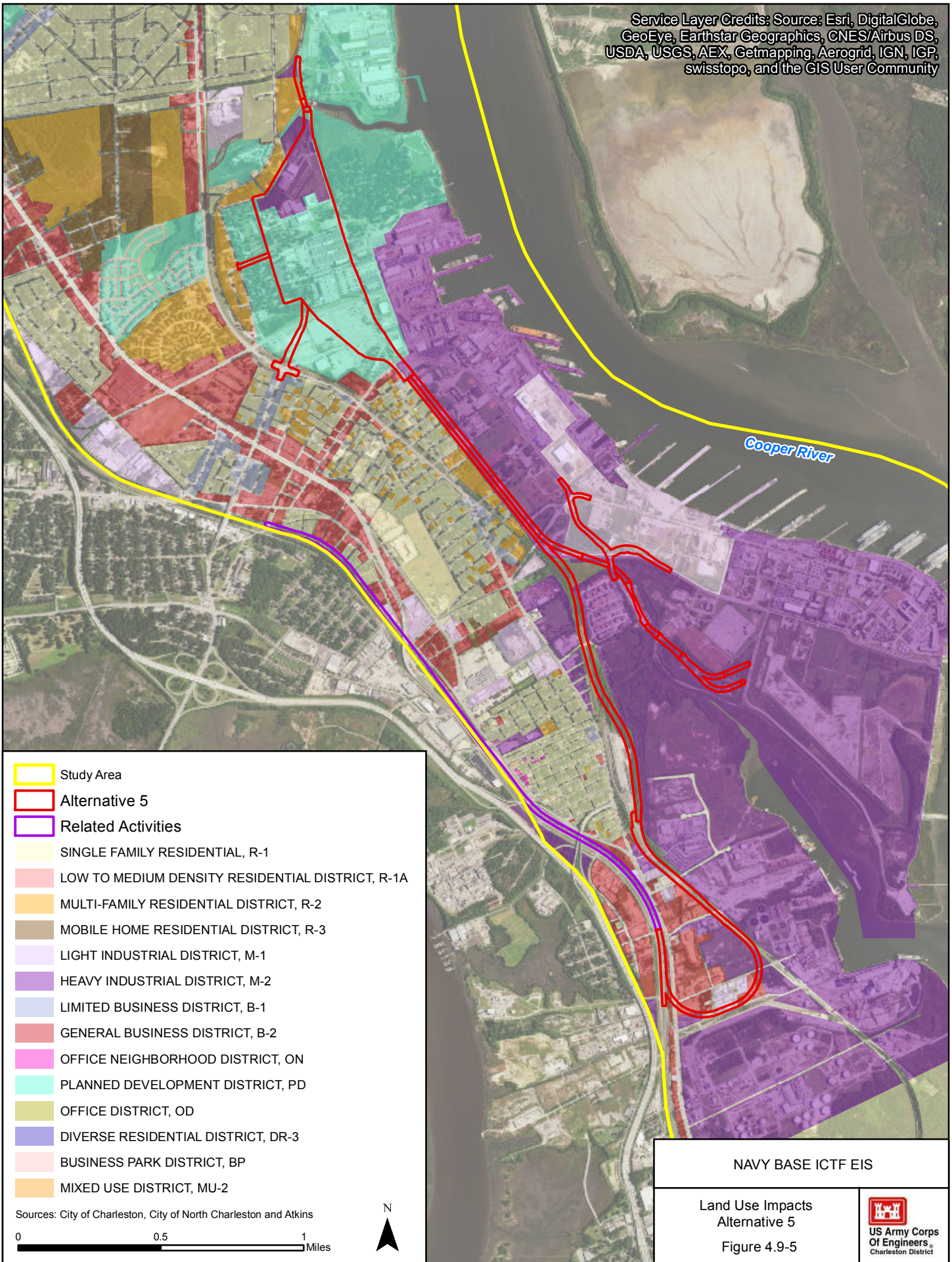
### **4.9.7.2 Infrastructure and Utilities**

Infrastructure and utility requirements and impacts under Alternative 5 would be similar to those described for the Proposed Project, with the exception that potable water, sanitary sewer, and natural gas pipelines within the River Center project site may be relocated and or temporarily turned off during construction activities. Any interruption of service to local area residents and businesses would be less than 12 hours.

For the reasons discussed above, Alternative 5 would have negligible impacts to land use, major impacts to demolition of structures, and negligible impacts to infrastructure.



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## **4.9.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital)**

### **4.9.8.1 Land Use and Zoning**

#### **River Center Project Site**

Under Alternative 6, land use and zoning impacts related to the River Center project site (Figure 4.9-6) would be similar to those described for Alternative 5.

#### **Roadway/Rail Improvements**

Under Alternative 6, land use and zoning impacts related to roadway and rail improvements (Figure 4.9-6) would be similar to those described for the Proposed Project.

#### **Demolition of Structures**

Construction of Alternative 6 would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the River Center project site, this construction would cause the demolition of approximately 48 structures. Additional off-site roadway and rail improvements would cause the displacement of approximately 40 structures.

#### **Infrastructure and Utilities**

Infrastructure and utility requirements and impacts under Alternative 6 would be similar to those described for Alternative 5. Any interruption of service to local area residents and businesses would be less than 12 hours.

For the reasons discussed above, Alternative 6 would have negligible impacts to land use, major impacts to demolition of structures, and negligible impacts to infrastructure.

## **4.9.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

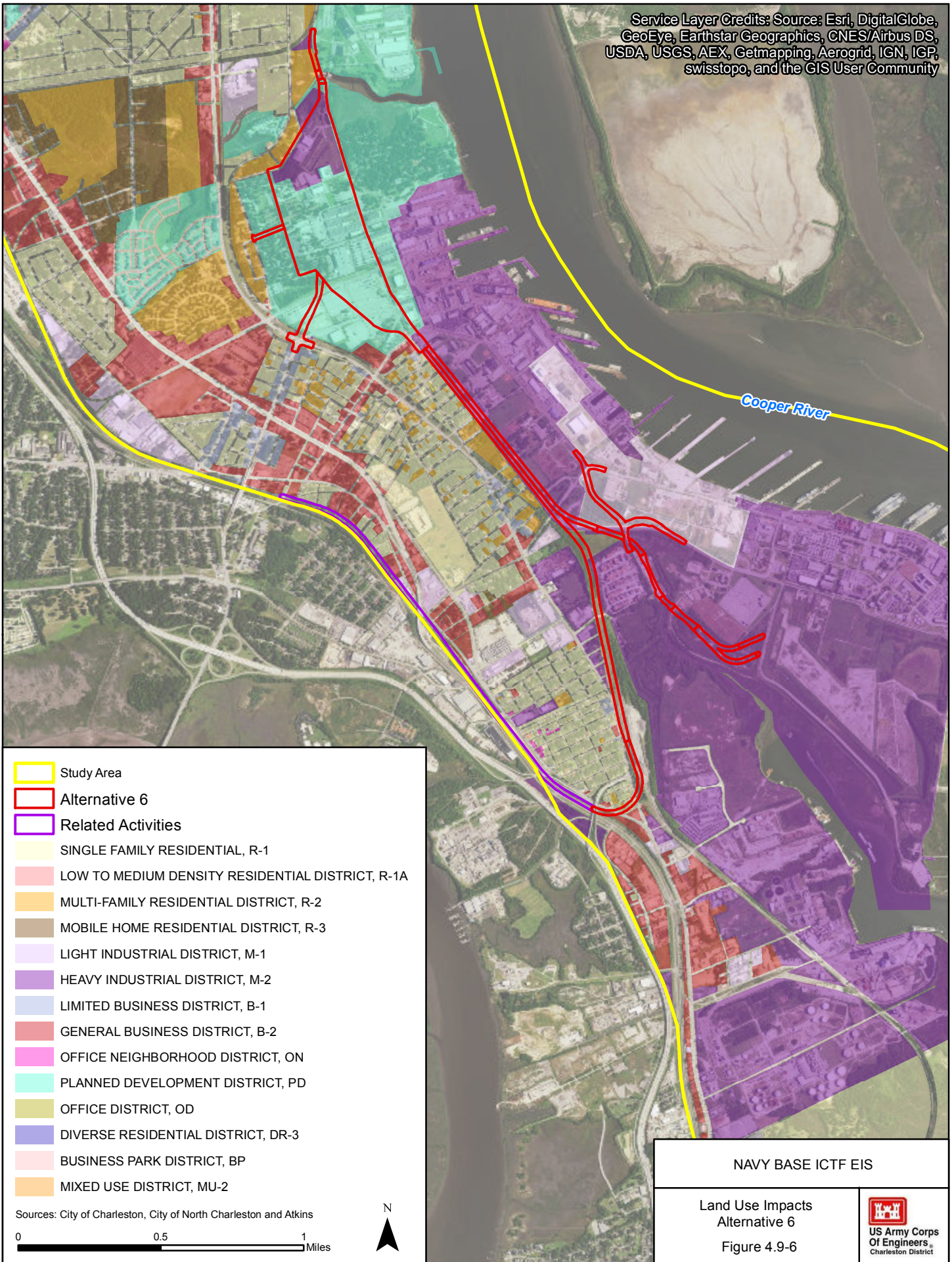
### **4.9.9.1 Land Use and Zoning**

#### **River Center Project Site**

Under Alternative 7, land use and zoning impacts related to the River Center project site (Figure 4.9-7) would be similar to those described for Alternative 5. It is anticipated that this action will require zoning changes and a Comprehensive Plan amendment.



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## Roadway/Rail Improvements

Under Alternative 7, land use and zoning impacts related to roadway and rail improvements (Figure 4.9-7) would be similar to those described for the Proposed Project.

## Demolition of Structures

Construction of Alternative 7 would occur on land owned by Palmetto Railways, on land within an existing CSX right of way, and on parcels of private property. Within the River Center project site, this construction would cause the demolition of approximately 48 structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 20 structures.

## Infrastructure and Utilities

Infrastructure and utility requirements and impacts under Alternative 7 would be similar to those described for Alternative 5. Any interruption of service to local area residents and businesses would be less than 12 hours.

For the reasons discussed above, Alternative 7 would have negligible impacts to land use and zoning, major impacts to demolition of structures, and negligible impacts to infrastructure.

### 4.9.10 Related Activities

#### 4.9.10.1 Land Use and Zoning

Land use and zoning requirements and impacts under the related activity would be negligible.

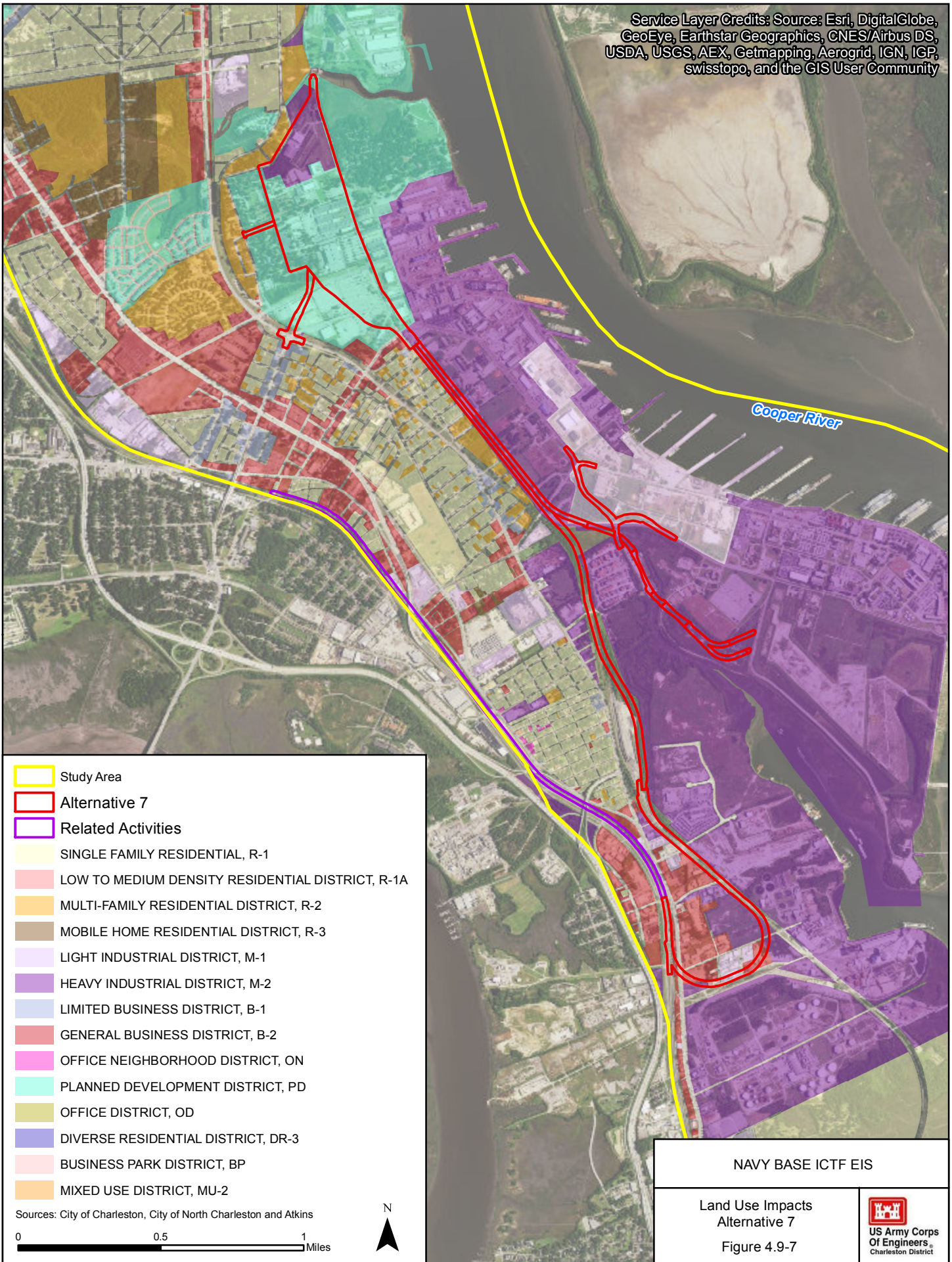
#### 4.9.10.2 Infrastructure and Utilities

There would be no infrastructure or utility requirements or relocations as a result of the related activities.

For the reasons discussed above, the related activity would have negligible impacts to land use and zoning, demolition of structures, and infrastructure.



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## 4.9.11 Summary of Impacts Table

Table 4.9-2  
Summary of Impacts, Land Use and Infrastructure

Alternative	Land Use Change	Demolition of Structures	Infrastructure and Utilities
<b>No-Action</b>	Negligible. No change in land use designation required.	Negligible. No non-Palmetto Railways owned or specially designated structures would have to be displaced or demolished.	Negligible. No impacts as upgrades to service are not anticipated.
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Major. Rezoning of the residential area along the western boundary of the ICTF and rezoning of portions of the project site from Institutional future land use. Comprehensive Plan amendment required.	Major. Approximately 100 non-Palmetto Railways owned or specially designated structures would have to be displaced or demolished. Additional off-site roadway and rail improvements would cause the demolition of approximately 50 structures.	Negligible short-term impacts as any interruption of service to local area residents and businesses would be less than 12 hours
<b>2: CSX – Milford / NS – S-line</b>	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project), except additional off-site roadway and rail improvements would cause the demolition of approximately 20 structures.	Similar to Alternative 1 (Proposed Project)
<b>3: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) except additional off-site roadway and rail improvements would cause the demolition of approximately 40 structures.	Similar to Alternative 1 (Proposed Project)
<b>4: CSX &amp; NS – Milford</b>	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Negligible. No change in land use designation required	Major. Approximately 48 non-Palmetto Railways owned or specially designated structures would have to be displaced or demolished. Additional off-site roadway and rail improvements would cause the demolition of approximately 20 structures.	Negligible short-term impacts as any interruption of service to local area residents and businesses would be less than 12 hours
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 5	Similar to Alternative 5 except additional off-site roadway and rail improvements would cause the demolition of approximately 40 structures.	Similar to Alternative 5



Alternative	Land Use Change	Demolition of Structures	Infrastructure and Utilities
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5

## 4.9.12 Mitigation

### 4.9.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Ensure the Proposed Project and its operations are consistent with zoning. (Avoidance)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to land use and infrastructure is also provided in Chapter 6.

### 4.9.12.2 Additional Potential Mitigation Measures

No additional mitigation measures have been identified by the Corps.

Ensure the Proposed Project and its operations are consistent with each municipality's existing zoning code and the adopted Comprehensive Plan. For any proposed construction that is not consistent with the existing zoning code and adopted Comprehensive Plan, it will be incumbent upon the Applicant to work with each municipality to go through the necessary processes to gain all administrative approvals related to land use to ensure compliance with all municipal land use regulations. It should be noted that In December 2012 the City of North Charleston and the South Carolina Division of Public Railways (now Palmetto Railways) entered into a Settlement Agreement and Release. Under the provisions of the Agreement, "City staff will support all reasonable rezoning, permitting and other administrative approvals necessary for implementation of the ICTF and associated railroad lines as well as any other activities required to facilitate the movement of cargo to and from the Port of Charleston" (Section II(C)(2), Case No. 2011-CP-10-491 through 494, 2011-CP-10-5550, and 2011-CP-10-3147). Because of this agreement it is anticipated this conditional use will be successfully negotiated and approved.

## 4.10 CULTURAL RESOURCES

### 4.10.1 Methods and Impact Definitions

Impacts to cultural resources were evaluated using literature review, GIS, best professional judgment, and proximity to construction and operation activities that could result in noise, vibration, and visual resource impacts. After all historic properties within the study area were identified through literature review and investigations conducted in support of this EIS, their locations were overlaid (using GIS) with the footprints of the alternatives to determine the proximity of the historic properties to the proposed facilities and the activities that would occur during their operation. For example, for impacts to historic districts, potential effects to the specific characteristics of the historic properties that create their historical significance (i.e., make them eligible for the NRHP) were reviewed to determine whether the alternatives would alter these characteristics in such a way that the NRHP eligibility of a specific historic property would be degraded or compromised. These characteristics were extracted from the information presented in the previous investigations that resulted in the determinations of eligibility from the NRHP nomination forms for the Charleston Navy Yard (CNY), Charleston Naval Hospital (CNH), and Charleston Navy Yard Officers' Quarters (CNYOQ) Historic Districts (all prepared in 2006).

The impact evaluation considers both construction and operation activities within the study area. Impacts to historic properties were characterized as adverse, not adverse, or no effect as defined under Section 106 of NHPA (Table 4.10-1). In addition, an evaluation was conducted to determine whether there were ways to avoid or minimize adverse effects. The Corps, in consultation with the SHPO, determines the nature of the effects and recommends appropriate mitigation where adverse effects cannot be avoided. Mitigative efforts generally are handled through the implementation of a Memorandum of Agreement (MOA) between the applicant, the lead Federal agency, the SHPO, and any other major stakeholders, including, as appropriate, Cooperating Agencies. The MOA identifies the responsibilities of each signator, the resources managed under the MOA, the procedures for developing and implementing mitigative actions (which may include specific criteria for particular actions), the procedures for resolving disputes among the signators, and the procedures for terminating the MOA. Most MOAs are attached to the Federal permits for an undertaking and may have specific timelines or milestones to ensure that managed resources are dealt with appropriately as the permitted action unfolds.

Consulting party status pursuant to Section 106 of the NHPA was requested by the Historic Charleston Foundation, the Preservation Society of Charleston, and the Naval Order of the United States in three separate letters received by the Corps during the 2015 public scoping period. The Corps granted these entities consulting party status on January 19, 2016.

Table 4.10-1  
Impact Definitions, Cultural Resources

No Effect	No Adverse Effect	Adverse Effect
No resources present or impacts would be at the lowest levels of detection: barely perceptible and not measurable, and thus do not alter any defining characteristic of a historic property. (No effect under Section 106.)	A direct or indirect alteration that would only slightly affect the character-defining features of a structure, resource, building, or district listed on or eligible for listing on the NRHP but does not compromise its eligibility. (No adverse effect under Section 106.)	A direct or indirect alteration of any characteristic of a historic property that qualifies it for inclusion in the NRHP; that diminishes the integrity of its location, design, setting, materials, workmanship, feeling, or association; or that diminishes the extent to which a resource retains its historic appearance. This can include the destruction of archaeological resources, alteration of historic viewsheds, and the modification or demolition of historic buildings (Adverse Effect under Section 106.)

#### 4.10.2 No-Action Alternative

Under the No-Action Alternative, the project site would continue to be used for mixed-use industrial activities. Activities would likely include the demolition of existing buildings and infrastructure, the alteration of the ground surface, and the installation of new buildings and structures necessary to support the light industries and warehousing/shipping entities that may occupy the future industrial space.

Construction activities and equipment would alter the current viewsheds and settings of historic properties near these lands and create vibrations and noise that may affect nearby historic properties. These alterations would be temporary, localized impacts, and would have no effect on cultural resources within the study area. Noise and vibration impacts would also be temporary and localized, and would have no effect on historic properties within the study area.

Impacts associated with the operation of a future industrial use within the project site would likely involve an increase in road and rail traffic as compared to the existing condition, but significantly less than that predicted for the Navy Base ICTF. Increased traffic would create noise and vibrations that might affect nearby historic properties, and could result in the construction of roadway and rail improvements that could affect the current viewsheds of historic properties (primarily in the River Center project site). Impacts would be local and long term. The intensity of traffic, and its proximity to historic properties, is unknown; however, Palmetto Railways would be required to consult with the SHPO to ensure that any activities (and resulting alterations and noise and vibration impacts), would be mitigated in accordance with the contractual obligations and covenants from the PA. As a result, there would be no adverse effects to cultural resources from operations at the project site.



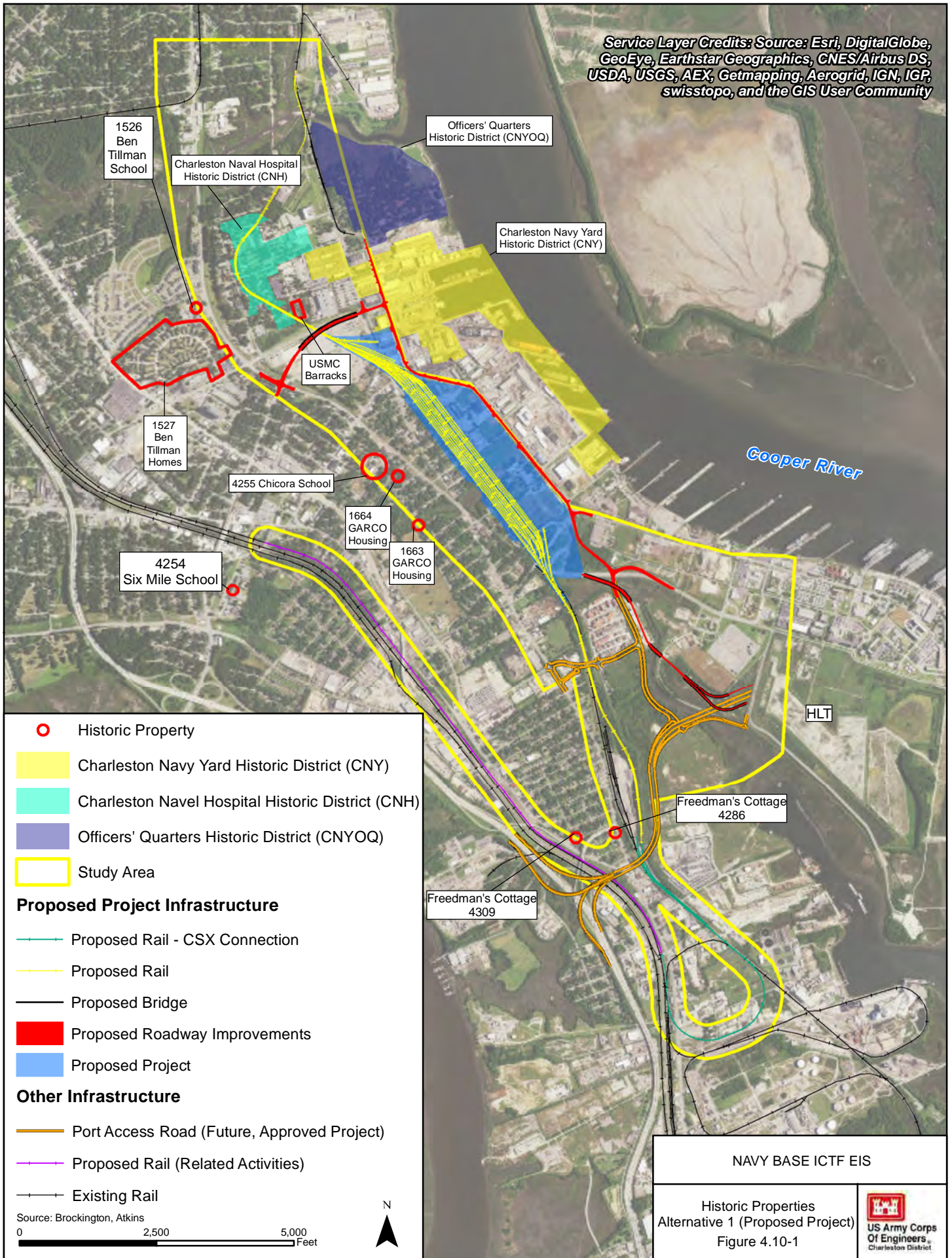
### 4.10.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Two historic properties, the CNH Historic District and USMC Barracks (CNC Building M-17) lie within the Proposed Project. Ten additional historic properties lie near the Proposed Project, including the CNY Historic District, the CNYOQ Historic District, the Chicora Elementary School, the Six Mile Elementary School, the Ben Tillman Graded School, Ben Tillman Homes, two Charleston freedman's cottages (Resources 4306 and 4309), and GARCO Employee Housing residences (Resources 1663 [which includes two buildings] and 1664). Figure 4.10-1 displays the location of the historic properties within and near the Proposed Project.

The northern rail link for NS rail access passes through the southwest corner of the parade ground of the USMC Barracks and then passes through or very close to several buildings in the CNH Historic District (CNC Buildings M-5, M-6/M-7, M-8/M-9, AA/LL, BB/CC, DD/EE, FF/GG, HH/II, JJ/KK, 762, and 763). The rail link will separate CNC Buildings M-6/M-7, M-8/M-9, FF/GG, HH/II, JJ/KK, and 758-763 from the remaining elements of the CNH. All of these buildings are contributing elements of the CNH Historic District, and originally served as residences for hospital staff.

The CNY Historic District lies to the east of North Hobson Avenue, to the east of the Proposed Project and partially within the eastern portion of the study area. CNC Building 32- Central Power Plant, a contributing element of the district, lies adjacent to the northeast corner of the Proposed Project; a number of large industrial buildings not included in the district stand between most of the Proposed Project and the remainder of this historic property. The northern rail link parallels the northwest corner of the CNYOQ Historic District with contributing elements of the district standing 800+ feet to the east, with vegetated areas and existing rail lines between these buildings and the rail link. The Chicora Elementary School stands approximately 1,200 feet west of the Proposed Project. Numerous residences and commercial buildings and Spruill Avenue stand between the Proposed Project and this historic property. The Six Mile Elementary School stands 500 feet west of the northern end of the CSX rail lines that will be upgraded as a related activity with other existing rail lines and vegetated areas in between. The Ben Tillman Graded School and Ben Tillman Homes stand on the west side of Spruill Avenue, approximately 1,000 feet west of the northern rail link; Spruill Avenue, existing rail lines, and residential buildings stand between these historic properties and the northern rail link. One of the freedman's cottages (Resource 4306) stands 500 feet west of the southern CSX rail link, with existing rail lines and vegetated areas between the house and the rail link. The other freedman's cottage (Resource 3409) stands 150 feet east of the CSX rail lines to be upgraded as a related activity; Meeting Street and ramps for I-26 stand between this building and the rail line. The surviving GARCO housing residences stand approximately 1,100-1,400 feet west of the Proposed Project. Numerous residential and commercial buildings stand between the Proposed Project and these historic properties.

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#### 4.10.3.1 Construction

Construction of the Proposed Project would result in the demolition of existing buildings, structures, and infrastructure (such as rail lines, roadways, power lines, sewer lines, etc.), the alteration of the ground surface, and the installation of new buildings and structures necessary to support the intermodal transfer of marine shipping containers between rail and road vehicles. The potential for archaeological sites to exist within the project site is minimal (cf. Daugherty 2011; Shmookler 1995), and thus, ground disturbing activities are not likely to damage or destroy archaeological sites.

Under Alternative 1 (Proposed Project), the CNH Historic District and the USMC Barracks would be affected. The northern rail link would extend through the CNH historic district and through the parade ground of the USMC Barracks, creating an adverse effect to these historic properties. The construction of the northern rail link would require the demolition and removal of multiple buildings associated with the CNH historic district, creating long-term, adverse impacts to this district. Elements of the CNH would be removed, destroying the associations that exist between the various elements. The rail line would also separate the remaining buildings, further degrading the associations and spatial relationships of these remaining elements. The designed landscape of the CNH would be substantially altered by the installation of a rail line through the district. The rail line also would pass very close to the USMC Barracks, altering the setting of this building and eliminating the open lawn that served as a parade ground when the building housed the USMC detachments assigned to Navy Base Charleston.

Construction activities and equipment also would alter the current viewsheds and settings of historic properties near the project; however, the alterations of the settings and viewshed by construction activities and equipment to the CNY and CNYOQ Historic Districts would be temporary, and would have no effect on the districts.

Vibrations related to construction activities under the Alternative 1 (Proposed Project) would be temporary and should not exceed those that occurred during the operation of Navy Base Charleston or industrial activities that occur today within the CNC. As a result, construction-related vibration would have no effect on historic properties.

#### 4.10.3.2 Operation

Under Alternative 1 (Proposed Project), the Navy Base ICTF would operate within new buildings/structures and transportation corridors; however, these new buildings/structures and infrastructure are industrial in nature and would not alter the character of the nearby historic properties within the CNC (the CNY and CNYOQ). The former Navy Base Charleston was an industrial facility that built and maintained ships. The historic properties within the CNC were the location of these industrial activities or supported the operation of the base and its assigned personnel. The project's industrial activities support commercial maritime traffic rather than the military maritime



traffic of the former navy base. The adaptive reuse of the CNC since the closure of Navy Base Charleston in 1996 has altered the character of the CNC from military to commercial over the last 20 years. Thus, changes in character of the historic properties within the CNC related to Alternative 1 (Proposed Project) would have no effect.

Under Alternative 1 (Proposed Project), operation of the Navy Base ICTF would result in higher volumes of rail and road traffic on dedicated rail lines and thoroughfares, increasing noise and vibration. Navy Base Charleston was an industrial facility and generated a great deal of noise and vibration during its operation as a military installation throughout the twentieth century. The noises associated with the operation of the ICTF would create local long-term, increased noise levels, but would not alter the industrial character and associations of the historic properties within the CNC. Similarly, historic properties in the nearby residential neighborhoods outside the CNC were built in support of the former Navy Base Charleston and witnessed the noises associated with the operation of the military facility. Since the closure of Navy Base Charleston in 1996, these noises have been reduced, but the CNC still contains industrial facilities similar to those that operated at the navy base. Thus, increased noise levels related to the operation of the Navy Base ICTF would result in long-term, increased noise levels, but would not alter the character and associations of the nearby historic properties outside the CNC. As a result, noise impacts would have no effect on historic properties within and outside the CNC.

Under Alternative 1 (Proposed Project), vibrations related to the increased volume of rail traffic and operations within the proposed intermodal container facility could affect nearby properties within the CNC; however, the analysis discussed in Section 4.13 (Noise and Vibration) found that the ground-borne vibration generated by train activities would produce negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed; therefore, vibration impacts would have no effect on historic properties within and outside the CNC. Periodic inspection and monitoring of masonry components of elements of the nearby CNY, CNH, and CNYOQ Historic Districts could identify whether these elements suffer adverse effects related to long-term exposure to increased vibrations resulting from the operation of the Navy Base ICTF.

#### **4.10.4      Alternative 2: Proposed Project Site (CSX – South via                   Milford / NS – North via S-Line)**

The same historic properties noted for Alternative 1 (Proposed Project) also are present near the footprint of Alternative 2; however, the configuration of the northern NS rail link is different in Alternate 2. It will loop 200-300 feet to the south and to the west of the CNH Historic District and USMC Barracks and parade ground in order to avoid direct impacts to these historic properties. The northern rail link will be farther from the CNYOQ Historic District, approximately 1,000 feet west of the district boundary and 1,800-2,000 feet from any CNYOQ contributing elements. The Ben Tillman Graded School and Bill Tillman Homes historic properties lie closer to the rail link (600-800 feet

west) but Spruill Avenue, existing rail lines, and narrow vegetated areas are present between these properties and the proposed rail line. Figure 4.10-2 displays the location of the historic properties within and near Alternative 2.

#### **4.10.4.1 Construction**

Construction of the Navy Base ICTF within Alternative 2 would result in the same potential effects as noted for Alternative 1 (Proposed Project) except there would be no direct impacts to the CNH Historic District and the USMC Barracks. The CNH Historic District would not suffer the loss of contributing elements since the construction of the northern rail link would be located west of the district. Thus, most of the effects (visual intrusions, noise, and vibration) related to construction within Alternative 2 are temporary and would have no effect on any historic properties. Again, the potential for archaeological sites to exist within Alternative 2 is minimal (cf. Daugherty 2011; Shmookler 1995).

#### **4.10.4.2 Operation**

Operation of the Navy Base ICTF within Alternative 2 also would result in the same potential effects as noted for Alternative 1 (Proposed Project) except there would be no disruption of the CNH Historic District or the USMC Barracks property. Similar to Alternative 1 (Proposed Project), vibration impacts would have no effect on historic properties within and outside the CNC.

### **4.10.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

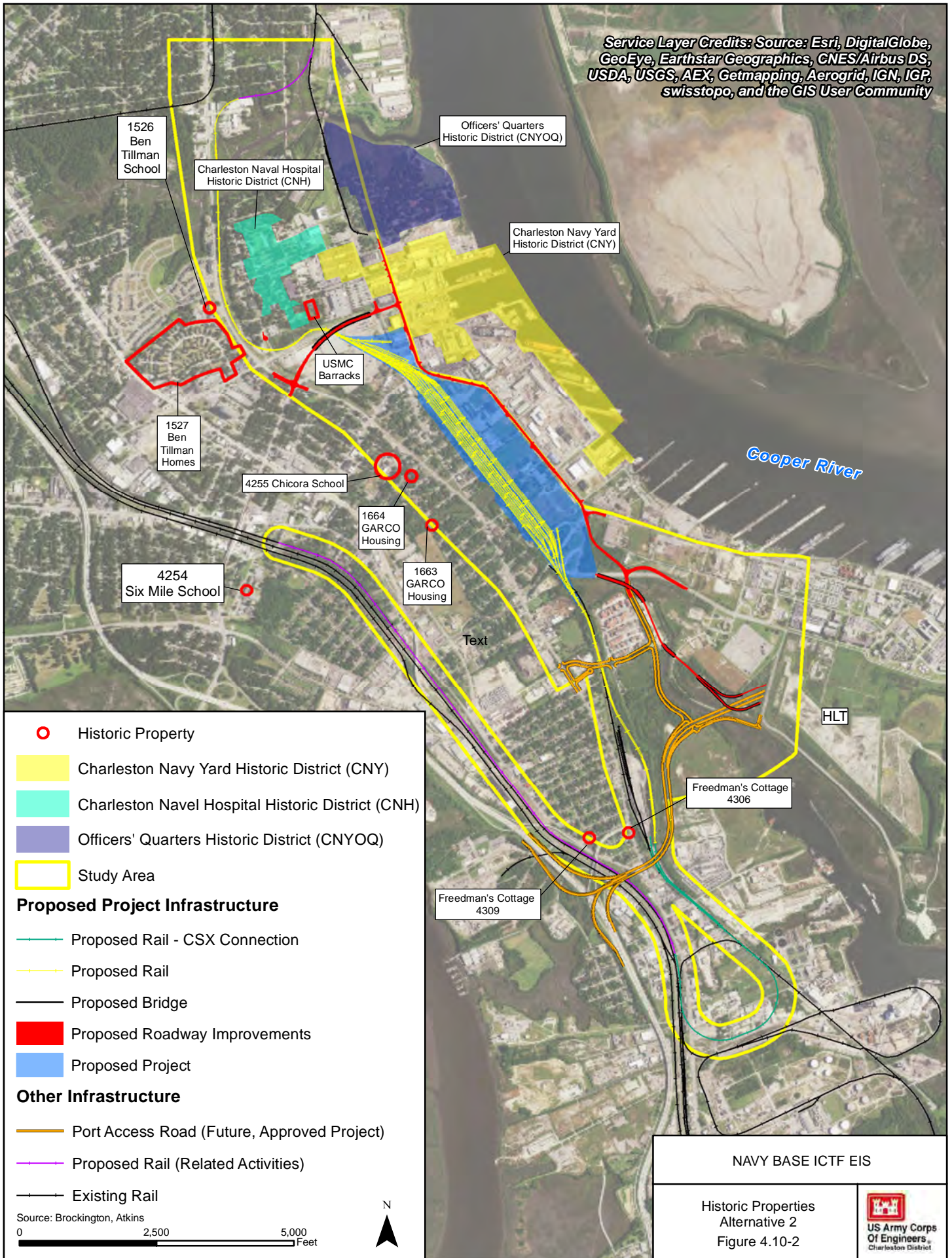
The same historic properties noted for Alternative 1 (Proposed Project) also are present near the footprint of Alternative 3. The relationships of all of the historic properties are the same as well with the exception of one of the Charleston freedman's cottages near the southern CSX rail links. Resource 4306 stands 300 feet west and north of the proposed loop of the southern link near Kingsworth Avenue, closer than for Alternative 1 (Proposed Project). Thus, the route of the northern rail link would pass through the CNH Historic District and across the parade ground of the USMC Barracks. Figure 4.10-3 displays the location of the historic properties within and near Alternative 3.

#### **4.10.5.1 Construction**

Construction of the Navy Base ICTF within Alternative 3 would result in the same adverse effects to the CNH Historic District and the USMC Barracks noted for Alternative 1 (Proposed Project). With the exception of the loss of contributing elements of the CNH Historic District and the USMC Barracks parade ground, the potential effects related to visual intrusions, noise, and vibration associated with the construction of the Navy Base ICTF within Alternative 3 are temporary and would have no effect on any historic properties. Again, the potential for archaeological sites to exist within Alternative 3 is minimal (cf. Daugherty 2011; Shmookler 1995).



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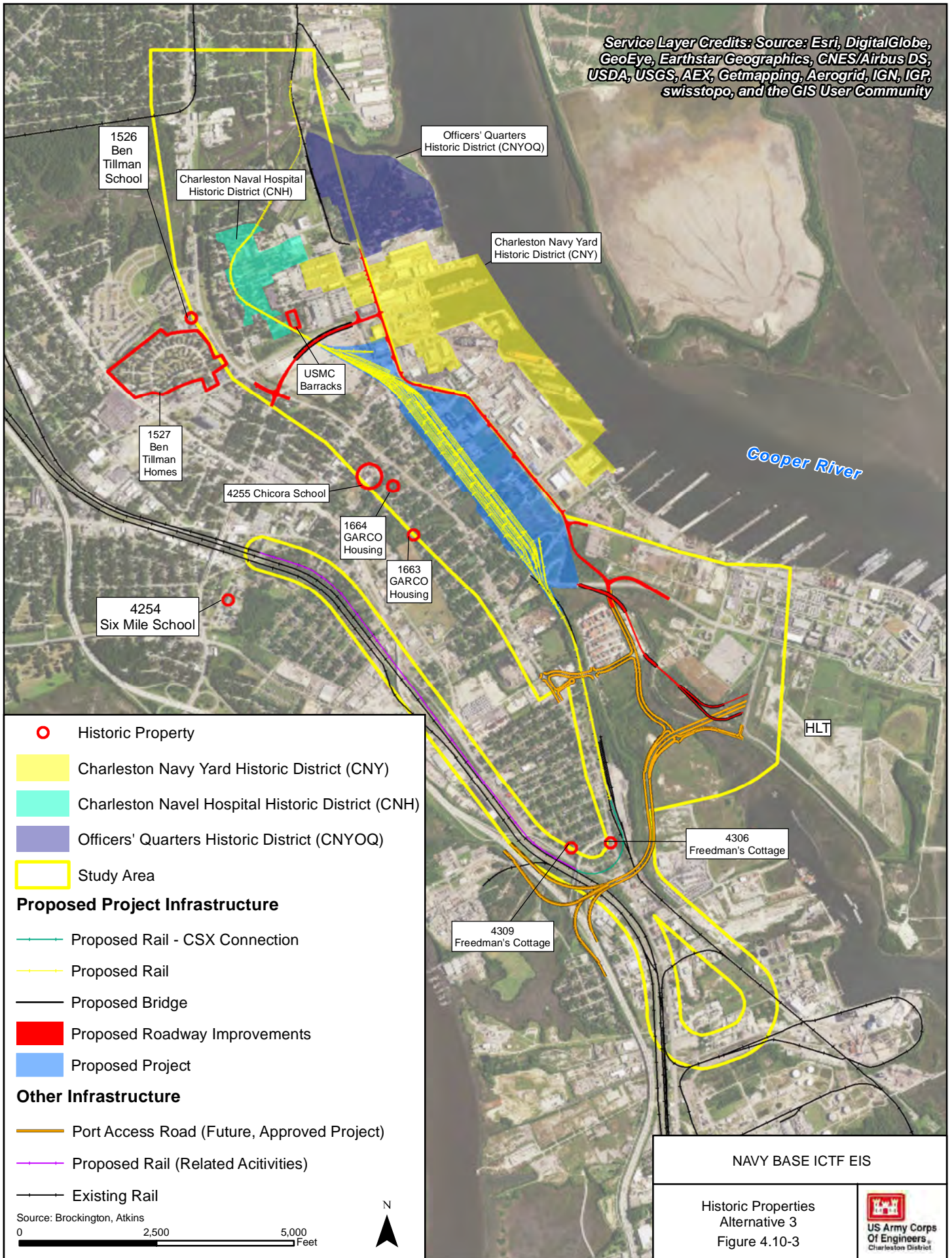
NAVY BASE ICTF EIS

Historic Properties  
Alternative 2  
Figure 4.10-2





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#### 4.10.5.2 Operation

Operation of the Navy Base ICTF within Alternative 3 also would result in the same potential effects as noted for Alternative 1 (Proposed Project), and include the disruption of the CNH Historic District and the USMC Barracks. Similar to Alternative 1 (Proposed Project), vibration impacts would have no effect on historic properties within and outside the CNC.

#### 4.10.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

The same historic properties noted for Alternative 1 (Proposed Project) also are present near the footprint of Alternative 4. The relationships of all of the historic properties are the same as well although all rail access would be through southern rail links. The route of a northern rail extension would pass through the CNH Historic District and across the parade ground of the USMC Barracks. Figure 4.10-4 displays the location of the historic properties within and near Alternative 4.

##### 4.10.6.1 Construction

Construction of the Navy Base ICTF within Alternative 4 would result in the same adverse effects to the CNH Historic District and the USMC Barracks noted for Alternative 1 (Proposed Project). With the exception of the loss of contributing elements of the CNH Historic District and the USMC Barracks parade ground, the potential effects related to visual intrusions, noise, and vibration associated with the construction of the Navy Base ICTF within Alternative 4 are temporary and would have no effect on any historic properties. Again, the potential for archaeological sites to exist within Alternative 4 is minimal (cf. Daugherty 2011; Shmookler 1995).

##### 4.10.6.2 Operation

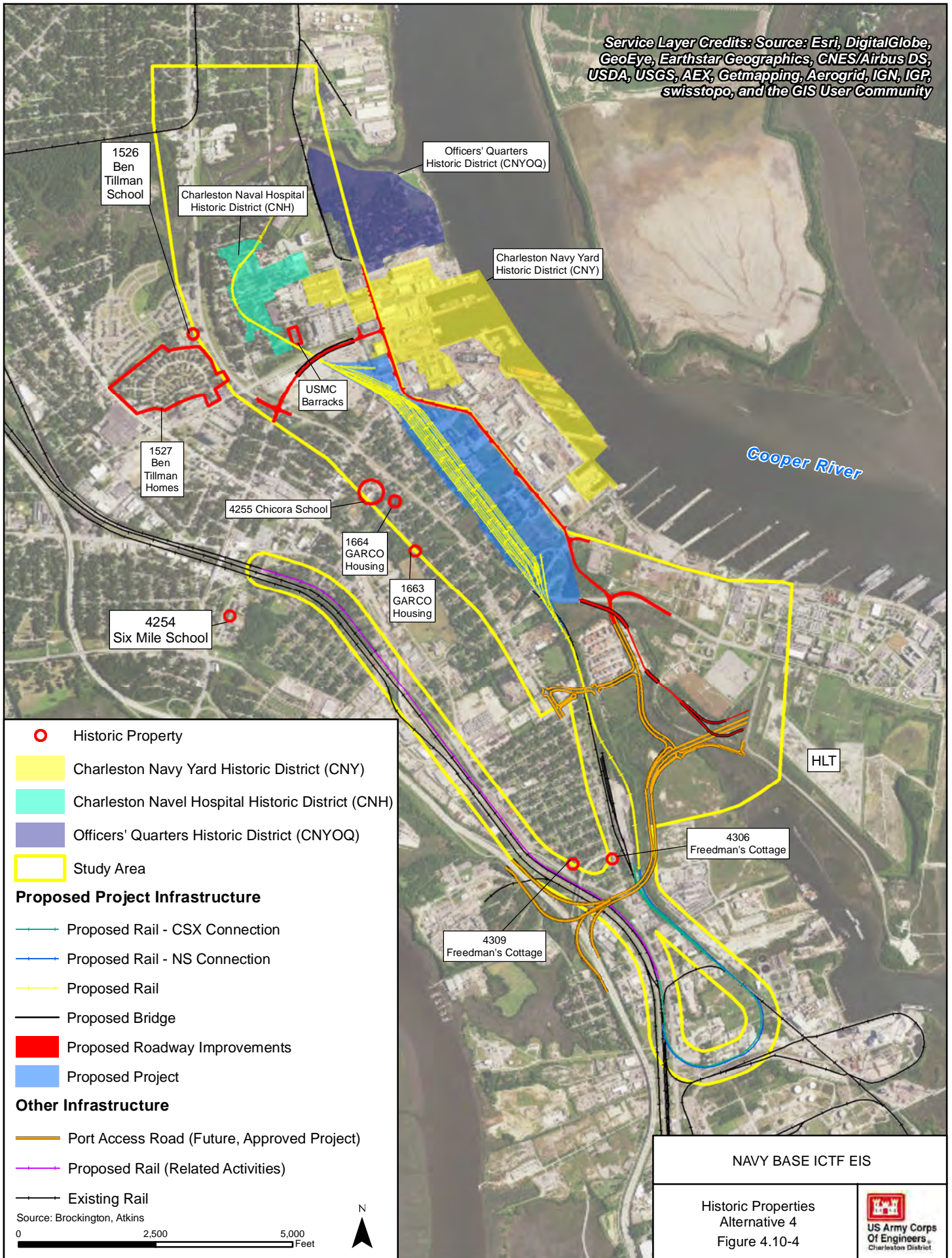
Operation of the Navy Base ICTF within Alternative 4 also would result in the same potential effects as noted for Alternative 1 (Proposed Project), and include the disruption of the CNH Historic District and the USMC Barracks. Like Alternative 1 (Proposed Project), vibration impacts would have no effect on historic properties within and outside the CNC.

#### 4.10.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

Three historic properties (two historic districts and one individual building) lie within the footprint of Alternative 5, including the CNY Historic District, the CNH Historic District, and the USMC Barracks. Eight additional historic properties (one historic district, one planned community of houses and apartments, and seven individual building [one historic property contains two buildings]) lie near Alternative 5, including the CNYOQ Historic District, the Ben Tillman Homes, the Ben Tillman Graded



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School, the Chicora Elementary School, the Six Mile Elementary School, GARCO employee housing (Resources 1663 [which includes two buildings] and 1664), and two Charleston freedman's cottages (Resources 4306 and 4309). Figure 4.10-5 displays the location of the historic properties within and near Alternative 5.

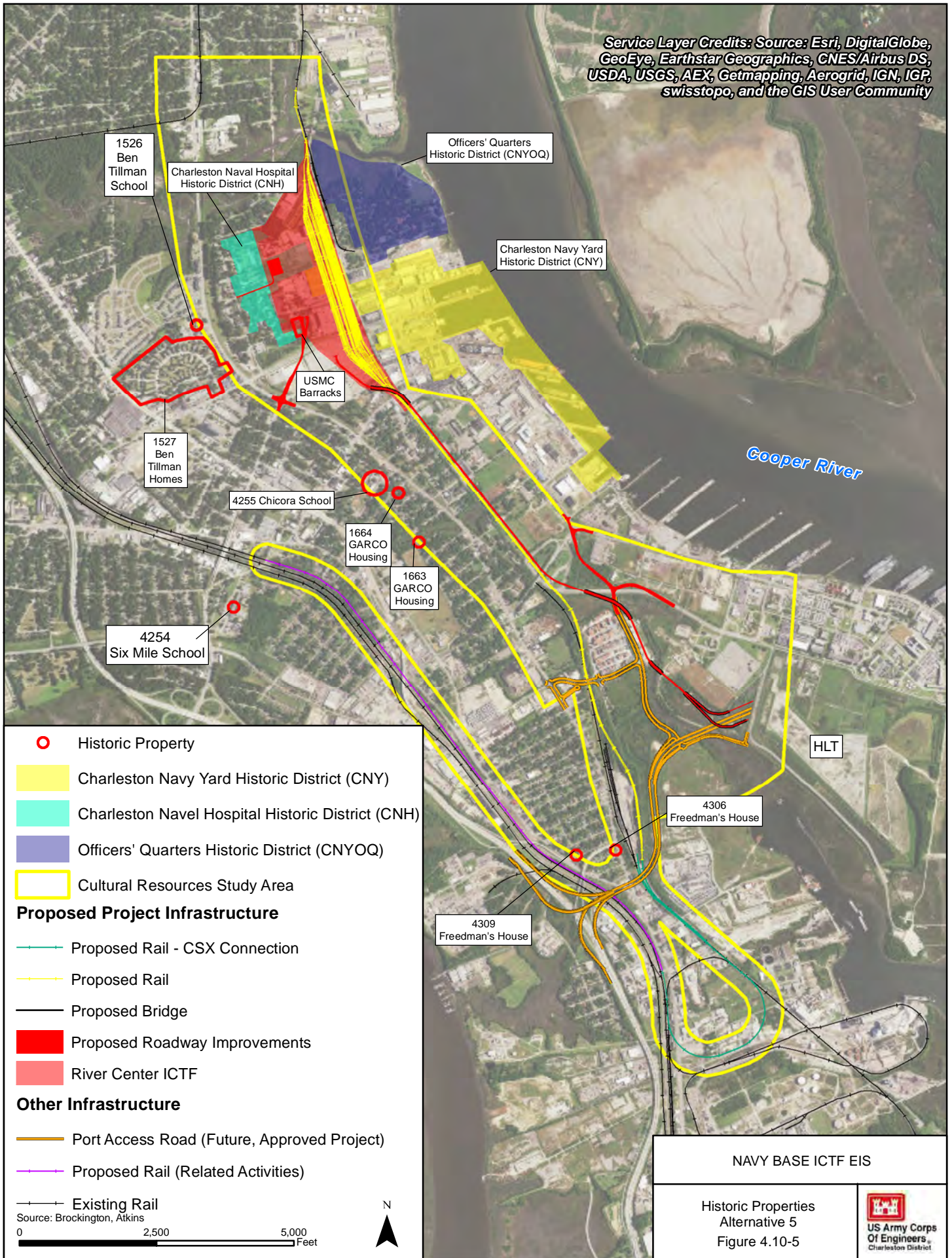
Four elements of the CNY Historic District lie within Alternative 5. These elements are CNC Buildings 64, NSC 66, NSC 67 (all three are storehouses that contribute to the NRHP eligibility of the district), and CNC Building 1655 (a modern storage building that does not contribute to the district). The majority of the historic resources for this district lie to the east of Alternative 5 and outside of the study area. Fourteen elements of the CNH Historic District lie completely within Alternative 5. These elements include CNC Buildings M-3A, M6/M7, NH-45, NH-46, NH-47, NH-49, NH-51, NH-53, NH-55, NH-61, NH-68, and 758 (treatment facilities, storehouses, residences, and a garage that contribute to the NRHP eligibility of the district); and CNC Building NH-62 (a storehouse) that does not contribute. The buildings and facilities of the CNH were originally separated from the naval industrial activities by a reasonable space, although storage buildings soon filled this space and began to encroach on the edge of the hospital campus. The CNYOQ Historic District lies to the northeast of Alternative 5 — outside but adjacent. As originally constructed, the elements of the CNYOQ stood as far removed from the naval industrial activities as possible, given the configuration of Navy Base Charleston. As the base expanded, some industrial facilities began to encroach on the edge of this residential neighborhood. Industrial buildings, some associated with the CNY Historic District, stand between Alternative 5 and this historic property.

The Ben Tillman Graded School and the Ben Tillman Homes stand on the west side of Spruill Avenue and the study area, approximately 700 feet and 800 feet west of Alternative 5, respectively. Private residences, Spruill Avenue, and rail lines lie between Alternative 5 and these historic properties. Chicora Elementary School and the GARCO employee houses (Resources 1663 and 1663) stand 1,100-1,400 feet west of the southern CSX rail link of Alternative 5. The Six Mile Elementary School stands 500 feet west of the northern end of the CSX rail lines that will be upgraded as a related activity with existing rail lines and vegetated areas in between. One of the freedman's cottages (Resource 4306) stands 500 feet west of the southern CSX rail link, with existing rail lines and vegetated areas between the house and the rail link. The other freedman's cottage (Resource 4309) stands 150 east of the CSX rail lines to be upgraded as a related activity; Meeting Street and ramps for I-26 stand between this building and the rail line.

#### 4.10.7.1 Construction

Construction of the River Center ICTF under Alternative 5 would result in the demolition of existing buildings, structures, and infrastructure, the alteration of the ground surface, and the installation of new buildings and structures necessary to support the intermodal transfer of marine shipping

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containers between rail and road vehicles. The potential for archaeological sites to exist within the Alternative 5 footprint is minimal (cf. Daugherty 2011; Shmookler 1995), and thus, ground disturbing activities are not likely to damage or destroy archaeological sites.

The demolition and removal of multiple buildings associated with the CNH and CNY Historic Districts would result in long-term, adverse effects. The NRHP-eligible USMC Barracks also stands within Alternative 5, and its demolition would result in an adverse effect to this historic building.

Construction activities and equipment would alter the current viewsheds and settings of four historic properties (the CNY, the CNYOQ, and the CNH Historic Districts, and the USMC Barracks) within or adjacent to Alternative 5 (see Figure 4.10-5). The alterations of settings and viewsheds of the CNYOQ historic district by construction activities and equipment would be temporary, resulting in local, short-term impacts, and thus no effect.

Noise and vibration impacts related to construction activities under Alternative 5 would be similar to those discussed under Alternative 1 (Proposed Project). These impacts would be temporary and should not exceed those that occurred during the operation of Navy Base Charleston or industrial activities that occur today within the CNC. There would be no effect on historic properties from noise and vibration during construction activities.

#### 4.10.7.2 Operation

The operation of the ICTF under Alternative 5 would have similar noise and vibration impacts to historic properties as described for the Navy Base ICTF under Alternative 1 (Proposed Project). The River Center ICTF would operate within new buildings/structures and transportation corridors that alter the setting of the CNC; however, the new buildings/structures and infrastructure are industrial in nature and would not alter the character of the CNC.

The CNH would have major changes to elements of the district, altering the setting of the district as a whole. Fourteen of the buildings associated with the district would be demolished. The associations of the remaining buildings would be severely compromised. The CNH was not an industrial facility but supported the industrial facility and the crews of the U.S. Navy ships that were stationed at Navy Base Charleston during its operation. While industrial facilities lie immediately adjacent to the district (on the opposite sides of roadways for the most part), the earliest buildings of the district were built within a designed layout. The loss of buildings and structures within this layout may severely degrade its cohesion and compromise its eligibility for the NRHP. This would create a long-term, adverse effect to the district.

The CNY would also be subjected to the loss of four former warehouses, which would create a long-term, major impact.



The CNYOQ Historic District would experience a local, long-term visual impact to its settings. Similar to the CNH, the buildings and infrastructure within the CNYOQ were not industrial in nature, but supported the operation of the former Navy Base Charleston. Again, all of the industrial activities associated with the operation of Navy Base Charleston were separated from this district. Under Alternative 5, the River Center ICTF would be immediately adjacent to the CNYOQ. The industrial facilities associated with the River Center ICTF would be visible from portions of the CNYOQ, despite the presence of a noise abatement wall and other measures proposed by Palmetto Railways to minimize the visual impact of the facility. This alteration of setting would be an adverse effect. The closer proximity of industrial activities to the district also could result in higher noise and vibration levels than occurred during the military operation of Navy Base Charleston; however, vibration impacts would have no effect on historic properties within and outside the CNC.

#### **4.10.8      Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

The same historic properties noted for Alternative 5 also are present in and near the footprint of Alternative 6. The relationships of all of the historic properties are the same as well with the exception of one of the Charleston freedman's cottages near the southern CSX rail links. Resource 4306 stands 300 feet west and north of the proposed loop of the southern CSX link near Kingsworth Avenue, closer than the link under Alternative 5. Figure 4.10-6 displays the location of the historic properties within and near Alternative 6.

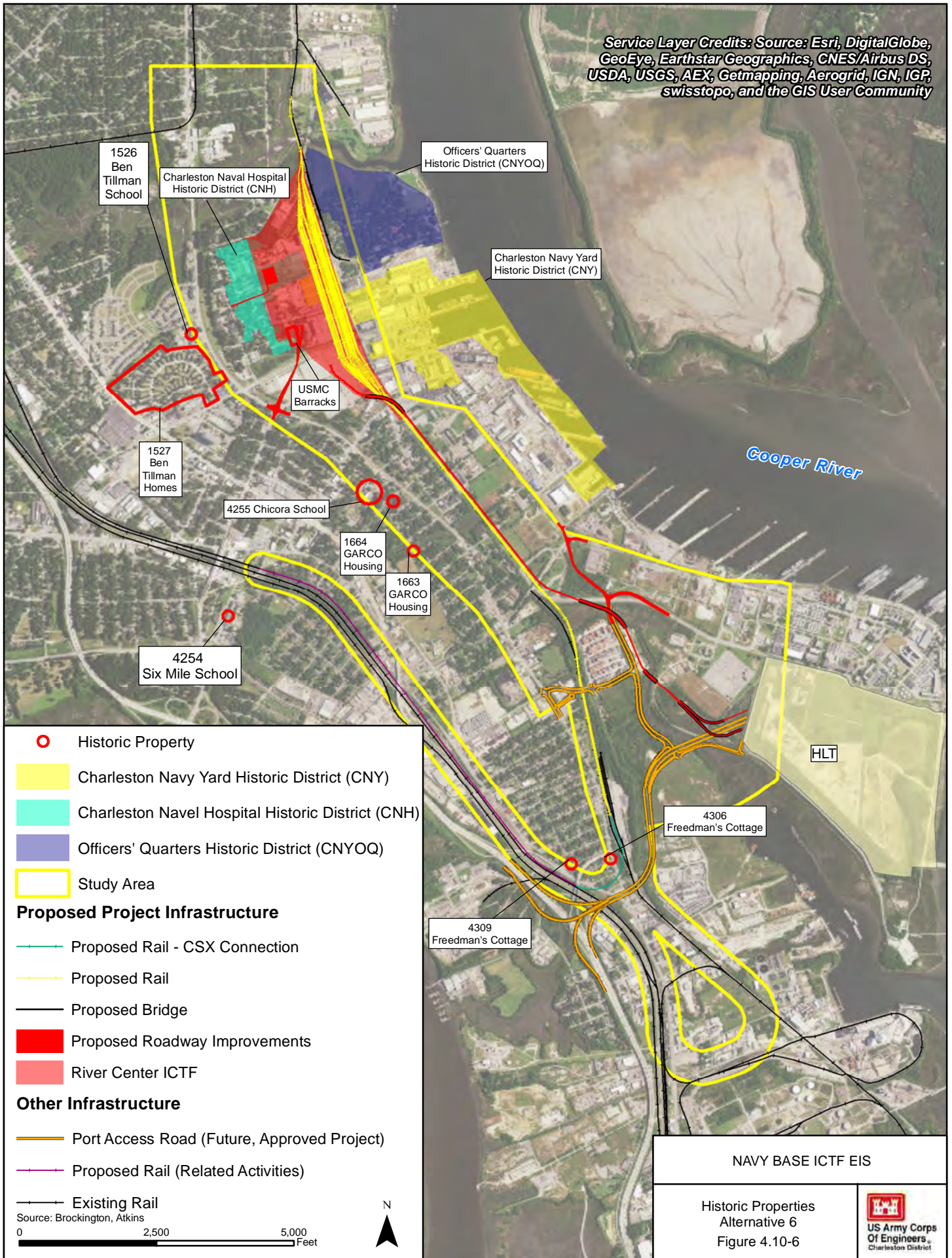
##### **4.10.8.1      Construction**

Construction of the River Center ICTF within Alternative 6 would result in the same adverse effects to the CNH, CNY, and CNYOQ Historic Districts and the USMC Barracks noted for Alternative 5. With the exception of the loss of contributing elements of the CNY and CNH Historic Districts and the USMC Barracks and parade ground, the potential effects related to visual intrusions, noise, and vibration associated with the construction of the River Center ICTF within Alternative 6 are temporary and would have no effect on any historic properties. Again, the potential for archaeological sites to exist within Alternative 6 is minimal (cf. Daugherty 2011; Shmookler 1995).

##### **4.10.8.2      Operation**

Operation of the River Center ICTF within Alternative 6 also would result in the same potential effects as noted for Alternative 5, to include the disruption of the CNH and CNY Historic Districts and the USMC Barracks. Similar to Alternative 5, vibration impacts would have no effect on historic properties within and outside the CNC.

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#### **4.10.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

The same historic properties noted for Alternative 5 also are present near the footprint of Alternative 7. The relationships of all of the historic properties are the same as well. Figure 4.10-7 displays the location of the historic properties within and near Alternative 7.

##### **4.10.9.1 Construction**

Construction of the River Center ICTF within Alternative 7 would result in the same adverse effects to the CNH, CNY, and CNYOQ Historic Districts and the USMC Barracks noted for Alternative 5. With the exception of the loss of contributing elements of the CNH and CNY Historic Districts and the USMC Barracks and parade ground, the potential effects related to visual intrusions, noise, and vibration associated with the construction of the River Center ICTF within Alternative 7 are temporary and would have no effect on any historic properties. Again, the potential for archaeological sites to exist within Alternative 7 is minimal (cf. Daugherty 2011; Shmookler 1995).

##### **4.10.9.2 Operation**

Operation of the River Center ICTF within Alternative 7 also would result in the same potential effects as noted for Alternative 5, to include the disruption of the CNH and CNY Historic Districts and the USMC Barracks. Similar to Alternative 5, vibration impacts would have no effect on historic properties within and outside the CNC.

#### **4.10.10 Related Activities**

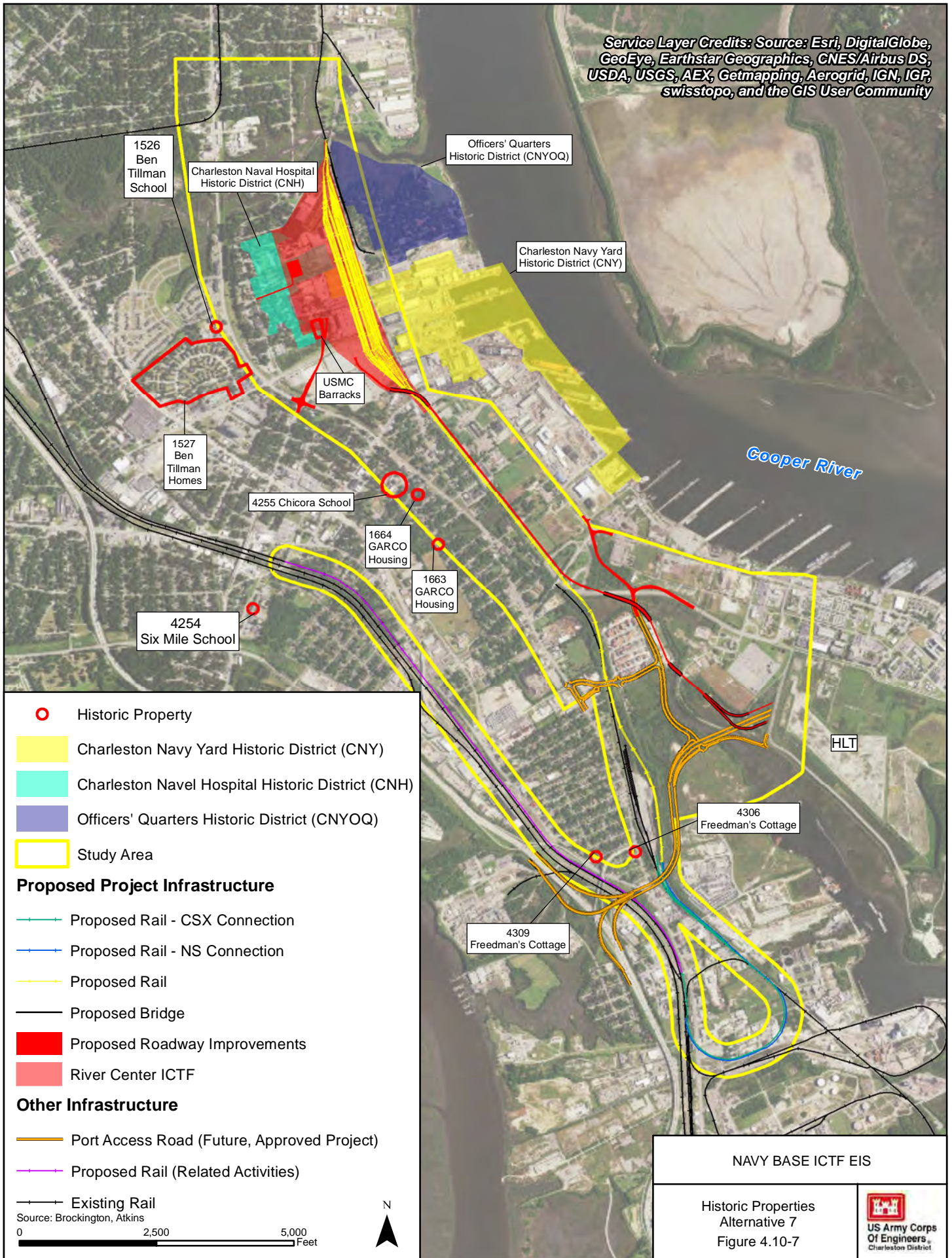
Upgrading and reopening existing rail lines for CSX and NS rail lines would occur in association with Alternatives 1-7. For Alternatives 1, 4, 5 and 7, this upgrading and reopening would occur from roughly Herbert Street north to Misroon Street to provide CSX rail links to the south. For Alternative 2, this upgrading and reopening would occur from roughly Herbert Street north to Misroon Street to provide CSX rail links to the south and from roughly Oakwood Avenue to Buist Avenue to provide NS rail links to the north. For Alternatives 3 and 6, this upgrading and reopening would occur from the I-26 Spruill Avenue ramps north to Misroon Street to provide CSX rail links in the south. Historic properties near the Related Activities include the two Charleston freedman's cottages (Resources 4306 and 4309) in the south and the CNYOQ Historic District.

##### **4.10.10.1 Construction**

Construction associated with the Related Activities would create potential effects related to visual intrusions, noise, and vibration associated with the construction of the Navy Base ICTF. Like those identified for construction activities within Alternatives 1-7, these effects are temporary and would



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have no effect on any historic properties. Again, the potential for archaeological sites to exist within the footprint of the Related Activities is minimal since these areas are existing or former rail lines.

#### **4.10.10.2 Operation**

Operation of the Navy Base ICTF would increase the number of trains traveling over the rail lines of the Related Activities creating the same potential effects for nearby resources noted for Alternatives 1-7, namely noise and vibration. The distance between the northern NS Related Activity and the CNYOQ Historic District limits the impact of these potential effects to this historic property. The Charleston freedman's cottages (Resources 4306 and 4309) were originally built near active rail lines. Operation of the Navy Base ICTF would not affect any historic properties due to the distances between the improved rail lines and the CNYOQ Historic District and the original associations of Resources 4306 and 4309.

#### **4.10.11 Summary of Impacts Table**

Table 4.10-2 summarizes the environmental consequences to historic properties from the No-Action Alternative, Alternative 1 (Proposed Project), and Alternatives 2-7.

#### **4.10.12 Mitigation**

##### **4.10.12.1 Applicant's Proposed Avoidance and Minimization Measures**

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Minimize and avoid impacts to buildings and structures on the CNC. (Minimization)
- Minimize and avoid direct interaction with historic buildings and structures. (Minimization, Avoidance)
- Explore redevelopment opportunities for historically relevant structures including the Power House. (Minimization)
- Relocation of the Chapel of the Eternal Father of the Sea. (Minimization)
- Mitigate for community impacts associated with the project, including the loss of Sterett Hall (Mitigation).
- Support the City of Charleston in setting up Quiet Zones. (Minimization)

Table 4.10-2  
Summary of Impacts, Cultural Resources

Alternative	Historic Properties				
	<i>Charleston Naval Hospital (CNH) Historic District</i>	<i>Charleston Navy Yard (CNY) Historic District</i>	<i>Charleston Navy Yard Officer's Quarters (CNYOQ) Historic District</i>	<i>U.S. Marine Corps (USMC) Barracks</i>	<i>Other historic properties outside the Charleston Naval Complex (CNC)</i>
<b>No-Action</b>	No effect from vibration, noise, and/or alteration of setting	No effect from vibration, noise, and/or alteration of setting	No effect from vibration, noise, and/or alteration of setting	No effect from vibration, noise, and/or alteration of setting	No effect from vibration, noise, and/or alteration of setting
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	No effect from vibration; Adverse effect from demolition of contributing elements of the Historic District, and altered setting of the District	No effect from vibration	No effect from vibration	No effect from vibration; adverse effect from altered setting	No effect from vibration, noise, and/or alteration of setting
<b>2: CSX – Milford / NS – S-line</b>	No effect from vibration	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	No effect from vibration	Same as Alternative 1 (Proposed Project)
<b>3: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
<b>4: CSX &amp; NS – Milford</b>	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)



Alternative	Historic Properties				
	<i>Charleston Naval Hospital (CNH) Historic District</i>	<i>Charleston Navy Yard (CNY) Historic District</i>	<i>Charleston Navy Yard Officer's Quarters (CNYOQ) Historic District</i>	<i>U.S. Marine Corps (USMC) Barracks</i>	<i>Other historic properties outside the Charleston Naval Complex (CNC)</i>
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	No effect from vibration; Adverse effect from demolition of contributing elements of the Historic District, and altered settings of the Districts	No effect from vibration; Adverse effect from demolition of contributing elements of the Historic District, and altered settings of the Districts	No effect from vibration; Adverse effect from altered settings of the Districts	Adverse effect from demolition of NRHP-listed building and altered settings of the Districts	No effect from vibration, noise, and/or alteration of setting
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5

- Construct a landscaped earthen berm with security fence, use directional lighting, and implement other identified mitigation measures that minimize noise, visual, and air quality impacts to adjacent communities. (Mitigation)
- Construct a noise abatement wall in areas where there are engineering and environmental constraints with the earthen berm. (Minimization)
- \*To maximize positive benefit and minimize negative impacts, an expanded Community Mitigation Plan will be developed in partnership with community organizations and State agencies and made a part of the Final EIS. (Mitigation)
- \*A community engagement and awareness plan (Appendix B) is being implemented to keep stakeholders and the public engaged and informed. (Minimization)
- Evaluate short and long-term employment and job training opportunities for the local community. (Minimization)
- Implement four-container-tall stacking limits to reduce visual impacts on surrounding neighborhoods. (Minimization)

- Palmetto Railways is working with the Lowcountry Orphan Relief to mitigate impacts on their location or aid in their relocation if desired. (Mitigation)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Navy Base ICTF is provided in Chapter 6, Table 6.1.

#### **4.10.12.2 Additional Potential Mitigation Measures**

In light of the potential for Adverse Effects to historic properties as a result of Alternative 1 (Proposed Project), the Corps has initiated Section 106 consultations with the SHPO. Mitigative efforts generally are handled through the implementation of a Memorandum of Agreement (MOA) between the applicant, the lead Federal agency, the SHPO, and any other major stakeholders, including, as appropriate, Cooperating Agencies. The MOA identifies the responsibilities of each signator, the resources managed under the MOA, the procedures for developing and implementing mitigative actions (which may include specific criteria for particular actions), the procedures for resolving disputes among the signators, and the procedures for terminating the MOA. Most MOAs are attached to the Federal permits for an undertaking and may have specific timelines or milestones to ensure that managed resources are dealt with appropriately as the permitted action unfolds. The Corps'-proposed measures for mitigating adverse effects include:

- Coordination with the SHPO to determine the level and extent of documentation (will require development of a Memorandum of Agreement that outlines the appropriate mitigative actions).
- If any previously unknown historic, cultural, or archaeological remains or artifacts are discovered during construction, the District Engineer for the Charleston District, U.S. Army Corps of Engineers must be notified immediately. Construction activity in the area should be avoided until required coordination has occurred.

## 4.11 VISUAL RESOURCES AND AESTHETICS

### 4.11.1 Methods and Impact Definitions

Federal agencies that have not created their own regulations and guidance for visual resource management and analyses generally rely on methodologies promulgated by other Federal agencies. The best known of these include the analytical frameworks developed by the U.S. Forest Service; U.S. Department of the Interior, Bureau of Land Management; and U.S. Department of Transportation, Federal Highway Administration, as described in the National Cooperative Highway Research Program Report 741, *Evaluation of Methodologies for Visual Impact Assessment*, (Transportation Research Board 2013). The methodology used in this EIS reflects the concepts and principles of the Visual Resource Management methodologies in use by these Federal agencies.

The impact evaluation considers both construction and operation activities within the study area. Potential effects to visual resources were assessed based on a comparison between Visual Intensity and Viewer Sensitivity. Potential obstruction of scenic views, both panoramic (such as a broad expanse of water or mountain range held over a considerable distance) and focal views (close-in views of a visual or historic resource), possible changes in the visual character of the existing landscape, and potential viewer sensitivity and viewing distance, can each contribute to the evaluation.

#### 4.11.1.1 Viewer Sensitivity

The determination of viewer sensitivity, ranging from none to high, considers the potential number of viewers, duration of the views, context of the viewing setting, viewing distances, and viewer expectations; for example, viewers would be more sensitive to landscape changes to foreground and middleground views. Viewer sensitivity is defined as follows:

High Sensitivity (H):	The potential for public concern over change in scenic/visual quality is great. Effected views are rare, unique, or in other ways are special and highly valued in the region or locale. Even the smallest perceptible change in visual conditions (Impact Intensity Level 3 [see below]) would be considered to be a substantial (significant) lessening of visual quality.
Moderate Sensitivity (M):	The potential for public concern over adverse change in scenic/visual quality is appreciable. Affected views are secondary in importance or similar to views commonly found in the region or locale. A moderately to highly intense visual impact (Impact Intensity Levels 1 or 2) would be perceived as a significant lessening of visual quality.



Low Sensitivity (L):	Generally, there may be some indication that a small minority of the public has a concern over scenic/visual resource impacts on the affected area. Only the greatest intensity of change in the condition of aesthetics/visual resources (Impact Intensity Level 1) would have the potential to register with the public as a substantial (significant) reduction in visual quality.
No Sensitivity (None):	The views are not public, or there are no indications of public concern over, or interest in, scenic/visual resource impacts on the affected area.

Based on the described methodology, viewer sensitivity is identified for each of the seven selected viewpoint locations (Table 4.11-1). It should be noted that sensitive viewers do not include commercial or industrial uses; for purposes of this analysis, sensitive users include residents, recreational users, motorists, bicyclists, and pedestrians.

Table 4.11-1  
Viewpoint Sensitivity

Viewpoint	Sensitivity
1. Southern boundary of the Union Heights Neighborhood	Low
2. Intersection of Baxter Street and Spruill Avenue	Low
3. Chicora-Cherokee residential neighborhood east of Spruill Avenue	Moderate
4. Chicora-Cherokee residential neighborhood west of Spruill Avenue	Moderate
5. Intersection of McMillan Avenue and Spruill Avenue	Moderate
6. River Place and Horizon Village facing east across Spruill Avenue	Moderate
7. Riverfront Park and Noisette Creek east of Spruill Avenue	High

#### 4.11.1.2 Impact Intensity

When a potential visual impact is identified, it is further defined and described in relation to the intensity of the impact. The intensity of a visual impact depends upon how noticeable the change may be. It is indicated by the degree to which existing visual conditions (the baseline for the analyses) would change as a result of features of project construction and operation. Viewer exposure is affected by the physical distance from and location of viewers relative to a resource, the number of viewers, and the duration of their view. For example, a passenger in a car will have a substantially different appreciation for a view than a driver. The same is true of a pedestrian who can linger to enjoy a view, rather than a motorist (either driver or passenger) who cannot stop to experience a view but passes it while moving.

The severity of an effect is partly dependent on the duration of the effect and whether the effect would last for an appreciable period of time—usually one year or longer—(as opposed to being ephemeral or brief); however, visual effects enduring for less than one year may also be moderate or major, depending on the temporal context (assuming criteria for impact intensity and viewer sensitivity have been met). For the purposes of this evaluation, duration includes:

- Temporary Visual Effects—Those lasting for one year or less
- Short-Term Effects—Those lasting for more than one year, but less than five years
- Long-Term Effects—Those lasting for five years or more

Considering the above criteria (degree of change, viewer exposure, duration of effect), the intensity of an impact is defined as follows:

- Level 1: A substantial change in visual character and quality or complete obstruction of view; introduction of elements that would be substantially inconsistent with the surrounding visual character in a historic district, specific plan area, or other area that is designated in a policy document or is otherwise identified as being important visually; and introduction of substantial new sources of light or glare that could disturb nighttime sleep or outdoor nighttime activities. The effect would be perceptible over a large geographic area by a substantial proportion of viewers for a longer duration (more than one year).
- Level 2: The change would partially obstruct a scenic view and/or introduce elements that would be somewhat inconsistent with the surrounding visual character in a historic district, specific plan area, or other area that is designated in a policy document or is otherwise identified as being important visually. The effect would be perceptible to a large number of viewers and the effect would be of greater extent (i.e., not limited to a short distance from the project site). Duration could be temporary but over an extended period of time (greater than one year).
- Level 3: The change in visual character would be visible to a limited number of viewers and/or the activity would result in very limited obstruction of scenic views. There would be only minor introduction of inconsistent visual elements in a historic district, specific plan area, or other area that is designated in a policy document or is otherwise identified as being important visually. Nighttime views would not be substantially impaired. Any disruption of sleep or nighttime outdoor activities as a result of light and glare would be perceptible to few and would be localized to an extremely limited geographic area. The effect would typically be of limited duration and occur at long intervals.
- Level 4: The change in visual character would be barely noticeable. There would be minimal disruption of sleep or nighttime outdoor activities as a result of light and glare. The effect would typically be of very limited duration and/or not occurring often.

### 4.11.1.3 Impact Determination

The intensity of the impact is compared to the sensitivity of the affected view to determine whether a substantial reduction in the visual setting would likely occur. Note that a perceptible reduction in visual setting is not treated in this methodology as significant unless it is estimated to persist for more than one year. Also, an adverse visual impact may be major if it is inconsistent with applicable ordinances; the impact, however, must be estimated to last more than one year.

Table 4.11-2 provides a matrix of the level of effect for each viewer sensitivity category and impact intensity level. *Impact level* is determined by comparing viewer sensitivity to intensity of effect.

Table 4.11-2  
Impact Definitions, Visual Resources and Aesthetics

		Viewer Sensitivity			
		<i>High</i>	<i>Moderate</i>	<i>Low</i>	<i>None</i>
Impact Intensity	Level 1	Major adverse	Major adverse	Minor adverse	Negligible
	Level 2	Major adverse	Moderate adverse	Minor adverse	Negligible
	Level 3	Moderate adverse	Minor adverse	Negligible	Negligible
	Level 4	Minor adverse	Negligible	Negligible	Negligible

Potential impacts to visual resources and aesthetics discussed in this section include both temporary construction impacts and permanent impacts resulting from operation of the Navy Base ICTF. The analysis focuses on each alternatives' impact to viewer sensitivity as it relates to scenic views, scenic resources, visual quality and character, and light and glare. In addition, the alternatives analysis includes a discussion of impact to the selected viewpoints identified for the analysis.

### 4.11.2 No-Action Alternative

Under the No-Action Alternative, land uses on the project site and River Center project site would be consistent with local zoning and ordinances as described in Section 8 (Regulatory Environment Overview). The project site would continue to be used for mixed-use industrial activities. Activities would likely include the demolition of existing buildings and infrastructure, the alteration of the ground surface, and the installation of new buildings and structures necessary to support the light industries and warehousing/shipping entities that may occupy the future industrial space. Construction activities and equipment would alter the current viewsheds within the project site and River Center project site. The two existing intermodal rail yards (Ashley Junction and the 7-Mile Yard) would continue to handle and process current and projected future intermodal container traffic that would be transported by rail, and that CSX and NS would undertake operational and



structural modifications to Ashley Junction and 7-Mile rail yards. It is assumed the River Center project site uses would remain as under existing conditions.

### *Scenic Views*

As there is abundant vegetation in the study area and the topography is flat, scenic views are limited, and include the scenic overlook at Riverfront Park, the banks of Noisette Creek, and views of the Cooper River looking east from near the water's edge (i.e., beyond the existing and adjacent Port facilities east of the site). Potential redevelopment of the project site and/or construction within the River Center project site would not obstruct or alter these scenic views, and there would be no effect.

### *Scenic Resources*

As defined in Section 3.11 (Visual Resources and Aesthetics), visual resources are those visible natural or manmade elements that are particularly valued by a community and are afforded protection from alteration or obstruction through an adopted policy or regulation. Several resources identified in Section 3.10 (Cultural Resources) are also considered scenic resources, such as the CNYOQ Historic District. Under the No-Action Alternative, there would be no effect to these cultural (scenic) resources. As identified in Section 3.4 (Vegetation and Wildlife), the City of North Charleston requires protection of mature trees, considered in this analysis to be a scenic resource. Any mature tree removal must comply with the City of North Charleston's policy. There would likely be significant removal of mature trees under the No-Action Alternative, and removal would have to comply with the City of North Charleston's policy. The impact on viewer sensitivity to scenic resources from the No-Action Alternative would be minor adverse because of the loss of mature trees, though new plantings and other landscaping efforts would minimize the adverse effect as trees and other vegetation matured.

### *Visual Quality and Character*

The project site is currently developed, and includes industrial buildings (e.g., high-tech, maritime, aerospace, and manufacturing facilities), vacant parking lots, a recreational facility (Sterret Hall) and associated baseball fields, warehouses, Federal office buildings, and a few private businesses interspersed within a network of private roads. The project site is also located in the CNH historic district, which contains numerous contributing elements (e.g., structures).

Redevelopment by others would likely improve the visual quality and character over existing conditions, which includes expanses of vacant parking lots, grass fields (formally storage tanks and storage facilities), chain link fencing, and overhead power and telephone lines. Changes are assumed to conform to city zoning and building codes, contain landscaping, and be compatible with the existing industrial uses along the waterfront, and mixed uses including residential to the west and north. Cranes from shipyard operations, ships, and shipyard buildings are highly visible. There is some existing vegetation in the form of mature trees, but overall the vegetation is not of high quality

or dense enough to screen views of and from the project sites. Redevelopment efforts that did not introduce substantial new vertical elements (above 3-4 stories), or adversely impact the cultural resources within the project site, would likely result in a minor beneficial impact to the visual quality and character of the VRSA.

### *Light and Glare*

There is limited to no lighting currently on the project site and River Center project site, and no nighttime port activities. Existing lighting is for security, street illumination (e.g., street lights), and what is required to operate low-level cranes. Future development could increase levels of light and glare in the VRSA above existing conditions; however, this level of light and glare would be consistent with adjacent land uses and likely result in no impact to viewers and/or to adjacent residents during nighttime.

### *Selected Viewpoints*

Redevelopment efforts under the No-Action Alternative would have limited adverse impacts to the selected viewpoints. Table 4.11-3 identifies the impact determination for each selected viewpoint as well as the rationale for the determination.

Table 4.11-3  
Impact Determinations for Selected Viewpoints, No-Action Alternative

Viewpoint	Impact Intensity Discussion	Impact Determination
(#1) Southern boundary of the Union Heights Neighborhood	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by built features and vacant land. A lack of new ROW acquisition and placement of new rail would limit visual changes at this selected viewpoint. Impact intensity would be Level 4 in conjunction with the Low Viewer Sensitivity.	Negligible
(#2) Intersection of Baxter Street and Spruill Avenue	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by built features and vacant land. Two story or higher buildings may be seen on the project site above existing vegetation and trees by drivers. Impact intensity would be Level 3 in conjunction with the Low Viewer Sensitivity.	Negligible

Viewpoint	Impact Intensity Discussion	Impact Determination
(#3) Chicora-Cherokee residential neighborhood east of Spruill Avenue	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by built features and vacant land. Increased lighting on the project site would increase illumination during nighttime hours. Two story or higher buildings may be seen on the project site above existing vegetation and trees by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#4) Chicora-Cherokee residential neighborhood west of Spruill Avenue	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by built features and vacant land. Increased lighting on the project site would increase illumination during nighttime hours. Two story or higher buildings may be seen on the project site above existing vegetation and trees by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#5) Intersection of McMillan Avenue and Spruill Avenue	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by vacant land and some built features. Increased lighting on the project site would increase illumination during nighttime hours. Two story or higher buildings may be seen on the project site above existing vegetation and trees by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity; however, replacement of vacant parking lots with built structures and associated landscaping would likely result in a beneficial change to the visual quality of the selected viewpoint.	Minor Beneficial
(#6) River Place and Horizon Village facing east across Spruill Avenue	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by built features and vacant land. Three story or higher buildings could be seen in the distance on the project sites above existing vegetation and trees by residents and drivers. Impact intensity would be Level 4 in conjunction with the Moderate Viewer Sensitivity.	Negligible
(#7) Riverfront Park and Noisette Creek east of Spruill Avenue	Redevelopment efforts would likely consist of new built features within the existing mixed use and industrial area of the project sites that are currently dominated by built features and vacant land. Residents and drivers may likely see new three story or higher buildings in the distance across Noisette Creek on the River Center project site above existing vegetation and trees; recreationists would not likely be able to see such structures while on Noisette Creek. Impact intensity would be Level 4 in conjunction with the High Viewer Sensitivity.	Minor Adverse



### 4.11.3 Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Construction activities would change visual conditions within the project site in the short-term, lasting for approximately two years. Activities would consist of short-term ground disturbance, construction staging and activities, and construction associated with implementation of mitigation measures. Construction equipment such as backhoes, tractors, cranes, and trucks would be in active use throughout the construction period. Soils and building materials would be stockpiled until removal or use. Construction fencing and nighttime security lighting would be visible from areas that have views of the project site, primarily from McMillan Avenue and Reynolds Avenue, the streets in the Chicora-Cherokee residential neighborhood, and the residential uses along St. John's Avenue. Upon completion of the construction of the Navy Base ICTF, new visual elements would be introduced into the VRSA that include arrival/departure rail tracks, an at-grade railroad crossing, a new rail bridge over Noisette Creek, the Cosgrove-McMiallan Overpass, an earthen berm and security wall along the western border of the project site, electric wide-span gantry cranes (91 feet tall), mast lighting poles (85 feet tall), a container stacking area, administrative buildings, a drayage road, and roadway realignment in the vicinity of Hobson Avenue and Bainbridge Avenue. Existing visual elements that would be removed include the Viaduct Road overpass, all existing built structures within the project site, and homes, apartments, and security fencing along and within the western project site boundary (e.g., Chicora-Cherokee neighborhood).

#### *Scenic Views*

As noted for the No-Action Alternative, flat topography and abundant vegetation limit the number of scenic views in the VRSA. Scenic views in the VRSA include the banks of Noisette Creek, the scenic overlook in Riverfront Park, and views of the Cooper River. The new rail bridge would be placed adjacent to an existing rail bridge over the creek near Noisette Boulevard and would create a permanent, but similar, built structure in this largely natural setting. The impact intensity of this new rail bridge and subsequent train activity would be Level 4, as it would not affect a large number of viewers, would be intermittent in duration, and would occur in a very limited geographic area. Viewers of high sensitivity (e.g., recreationalists on the creek) would primarily be affected by this activity, thus resulting in a minor, permanent adverse impact to scenic views.

#### *Scenic Resources*

Scenic resources to the east of the Spruill Avenue CSX ROW include Noisette Creek, Riverfront Park, the CNH and CNYOQ historic districts, the USMC Barracks, and the Cooper River. In addition to the construction of a new rail bridge across Noisette Creek, new arrival/departure rail tracks would require the removal of CNH contributing structures to the historic district and would alter the setting of the USMC Barracks. Additionally, construction of the new tracks, and clearing and grading of the

project site, would remove numerous mature trees, including those along the border of the project site with the Chicora-Cherokee neighborhood.

The substantial number of mature trees along the border of the Chicora-Cherokee neighborhood, which are considered to be scenic resources, would be permanently removed for project construction and replaced with a vegetated earthen noise berm. Because of the permanent removal of a substantial number of mature trees the removal of contributing elements of the CNH historic district, and the altered setting of the USMC Barracks, the intensity of this impact would be Level 1. With moderate viewer sensitivity, Alternative 1 (Proposed Project) would have a major, permanent adverse impact to scenic resources.

### *Visual Quality and Character*

The majority of construction and operation activities of the Navy Base ICTF would not introduce visual elements that are inconsistent with the existing industrial/mixed uses and visual quality and character of the project site because the dominant visual elements in the VRSA are professional and industrial buildings, vacant parking lots, and the Port with its appurtenant structures (e.g., cranes); however, several construction and operation activities associated with the Proposed Project would result in a change to the visual quality and character of the VRSA. The use of wide-span gantry cranes and high mast lighting on the project site would introduce new vertical elements to the skyline of the VRSA that would be seen by a large number of viewers (residents, motorists, recreationists) during the day and night. While existing cranes can be seen adjacent to the project site along the bank of the Cooper River, the Proposed Project's wide-span gantry cranes would be located in a much closer proximity to residential neighborhoods and transportation networks, such as Spruill Avenue. The construction of the Cosgrove/McMillan overpass would also introduce a new vertical element to the VRSA as this bridge structure would be visible from multiple viewpoints in the VRSA. While the overpass would partially block views of gantry cranes and lighting masts on the project site for viewers north of McMillan Avenue, the wide-span gantry cranes and new overpass would result in a Level 2 intensity impact, and with moderate viewer sensitivity for this area, result in a moderate, permanent adverse impact to visual quality and character of the VRSA.

The construction of new built structures on the project site, such as the locomotive shop and administrative buildings, would incorporate architectural elements from historic naval buildings to maintain and enhance aesthetics with other structures surrounding the project site on the CNC. Additionally, landscaping within and around the facility footprint would be installed. In light of these mitigation measures by Palmetto Railways, the intensity impact from construction of project structures would be Level 3, and with low viewer sensitivity for this area, result in a negligible impact to the visual quality and character of the VRSA.

The removal of mature trees throughout the project site, and particularly along the border of the Chicora-Cherokee neighborhood, would alter the visual quality and character of the VRSA; however,

adherence to the City of North Charleston's regulations for mature tree removal, placement of new mitigation trees (if applicable), and maturation of newly landscaped vegetation/trees, the impact intensity would be Level 3. With moderate viewer sensitivity, the removal of mature trees would result in a minor adverse impact to visual quality and character of the VRSA.

The placement of new rail tracks to the North through the Hospital District would require the demolition of several contributing elements to the CNH historic district, and would alter the visual setting of the USMC Barracks. This activity would result in a Level 1 intensity impact, and with moderate viewer sensitivity for this area, result in a major, permanent adverse impact to the visual quality and character of the VRSA. Construction of the new rail bridge across Noisette Creek, and subsequent operation of the Navy Base ICTF, would create a permanent, but similar, built structure in this largely natural setting. The increased rail activity associated with the operation of the Navy Base ICTF would increase the number and visibility of trains in the VRSA; however, there is already a notable amount of rail activity in the VRSA. This increase in train activity would be a Level 3 intensity impact, and with moderate viewer sensitivity, result in a minor, permanent adverse impact to the visual quality and character of the VRSA. Placement of arrival/departure tracks to the south of the ICTF would occur in a largely industrial area with existing rail tracks and train activity. The impact intensity of the construction and operation of new rail in the southern portion of the project site would be Level 4 as it would not affect a large number of viewers, would be intermittent in duration, and would occur in a very limited geographic area. With the low viewer sensitivity in the area, there would be a negligible impact to the visual quality and character of the VRSA.

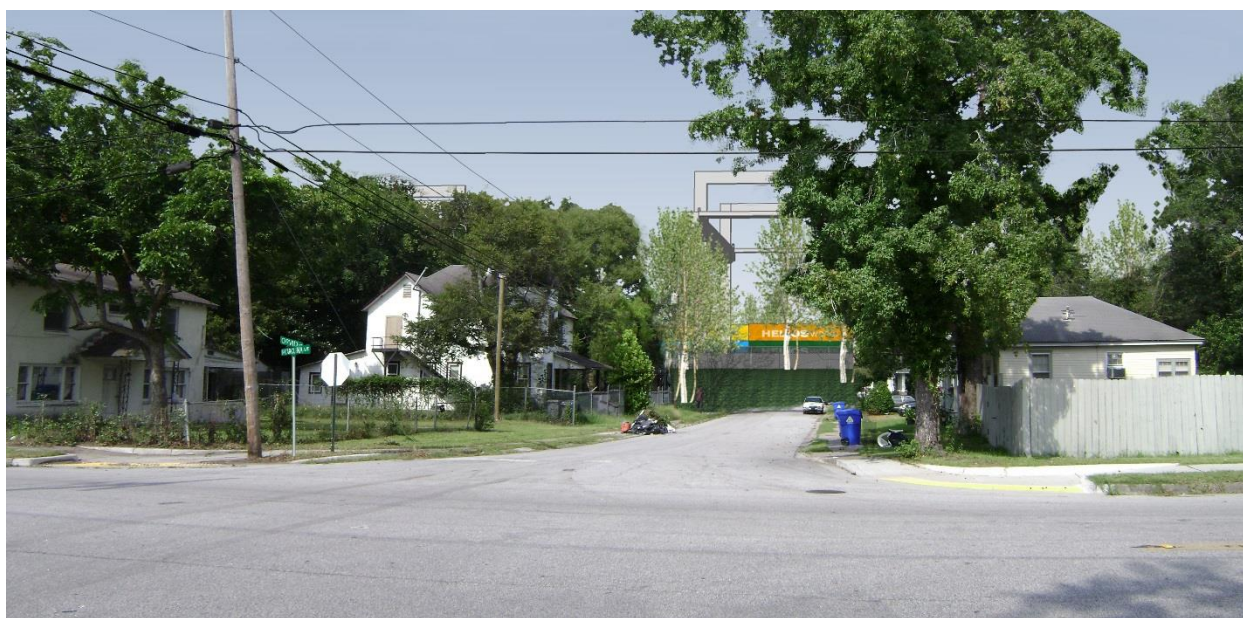
The roadway realignment of Hobson Avenue near Bainbridge Avenue would represent a Level 3 intensity impact as the area is industrial and the roadway network would stay primarily in place. With the low viewer sensitivity for the area, there would be a negligible impact. The removal of Viaduct Road would represent a Level 3 intensity impact, and with moderate viewer sensitivity for the area, result in a minor, permanent adverse impact to the visual quality and character of the VRSA. Construction and operation of the drayage road would represent a Level 3 intensity impact, and with low viewer sensitivity, result in a negligible impact to visual quality and character of the VRSA.

The construction of the earthen berm on the western boundary of the project site would block views of subsequent ICTF construction and ground-based operation activities of the Navy Base ICTF. While the removal of residential structures to accommodate the earthen berm would result in a change to the visual quality and character of the neighborhood, the presence of a landscaped berm and remaining residential structures, would result in a Level 3 impact intensity. With the moderate viewer sensitivity for the area, the construction of the earthen berm would result in a minor, permanent adverse impact. The following images show Orvid Street as it is today and a visualization of how the earthen berm of the Proposed Project would change the view.





Photo Visualization of the project site facing east on Orvid Street from North Carolina Avenue.



Facing east on Orvid Street from North Carolina Avenue with the Construction of the Earthen Berm.

### *Light and Glare*

New vertical elements that would be sources for light and glare include the 85-foot-tall mast lighting that would be illuminated from dusk to dawn, as well as new train activity using the arrival and departure tracks. As per Palmetto Railways' proposed mitigation measures, the lighting on the ICTF

would be directed downward and shielded to reduce spill light onto adjacent residential uses, and the photometric design would result in less than 0.5 foot-candles outside of the project site. Analysis of lighting effects on residential structures adjacent to the project site within the Chicora-Cherokee neighborhood indicate that illumination would result in the desired mitigation of light illumination of less than 0.5 foot-candles (see Appendix B). As a result of these mitigation measures, the impact intensity from high mast lighting would be Level 3, and with moderate viewer sensitivity, would result in a minor, permanent adverse impact. Lighting of the ICTF during night time would not be of sufficient illumination as to disturb sleep and other nighttime activities off of the project site.

49 CFR Part 229, Subpart C, Section 229.125 prescribes the minimum levels of lighting required for locomotives and rear train cars. It requires that each headlight is to be aimed to illuminate a person at least 800 feet ahead and in front of the headlight, which can be composed of either one or two lamps. A peak intensity of at least 200,000 candela<sup>36</sup> is required aimed directly ahead, 3,000 candela at an angle of 7.5 degrees and at least 400 candela at an angle of 20 degrees from the centerline of the locomotive when the light is aimed parallel to the tracks.

Table 4.11-4 summarizes common outdoor light levels for comparison.

Table 4.11-4  
Outside Light Levels

Condition	Illumination	
	(ftcd)	(Candela)
Sunlight	10,000	9,810
Full Daylight	1,000	981
Overcast Day	100	98.1
Very Dark Day	10	9.8
Twilight	1	0.98
Deep Twilight	.1	0.098
Full Moon	.01	0.0098
Quarter Moon	.001	0.00098
Starlight	.0001	0.000098
Overcast Night	.00001	0.0000098
Source: <a href="http://www.engineeringtoolbox.com/light-level-rooms-d_708.html">http://www.engineeringtoolbox.com/light-level-rooms-d_708.html</a>		

<sup>36</sup> Candela is defined as the amount of energy emitted by a light source. One foot-candle (ftcd) is equivalent to 0.981 candela.

When trains operate at night, train headlights could shine into residential windows at points where the track turns, primarily affecting structures within the Hospital District (e.g., near McMillan Avenue and St. Johns Avenue). Even in daylight, train headlamps are required to be illuminated for safety.

Apparent brightness is different from candela, which is the measure of the energy output of the headlamp. Apparent brightness refers to how the energy output is perceived by the viewer, which is a function of both direction and distance. The farther away a viewer is from the light source, the less bright the lamp will appear. Similarly, when viewed from an oblique angle, apparent brightness also decreases with the increase in angle of view. As noted above, Federal law requires that train headlamps emit 200,000 candela directly ahead to a distance of at least 800 feet. This intensity is approximately 20 times the intensity of sunlight. The intensity of the illumination decreases to 400 candela at an angle of 20 degrees from the horizontal. An intensity of 400 candela at an angle of 20 degrees from the horizontal would only be approximately four times greater than the apparent brightness on an overcast day. Therefore, the effect on residential uses would be substantial only where the train headlamps shine directly ahead into the residences, the residences are less than 800 feet from the tracks without visual obstruction, and where the tracks curve (otherwise the tracks are parallel to residential uses).

This effect would be similar to the flash of vehicle headlights, although substantially more intense. Residences and other structures within the Hospital District are most likely to be affected by train headlamps at night, with the likelihood of no more than 2 trains at night with full build-out. Only those residences within 800 feet of the direct beam of the trains would be affected, though intervening vegetation, trees, and other structures would help to block the light. Although the effect of train lighting on viewers in locations where the tracks curve could be intense, the effect would be momentary and occur seldom, and few viewers over a minimal geographic area would be impacted. The impact intensity would be Level 3, and with moderate viewer sensitivity, there would be a minor adverse impact from light and glare.

Light from increased truck traffic along the drayage road would not be anticipated to affect adjacent residential uses given the earthen berm wall that would be constructed at the western boundary of the project site.

### ***Selected Viewpoints***

Redevelopment efforts under Alternative 1 (Proposed Project) would have adverse impacts to the selected viewpoints. Table 4.11-5 identifies the impact determination for each selected viewpoint as well as the rationale for the determination.



Table 4.11-5  
Impact Determinations for Selected Viewpoints, Alternative 1 (Proposed Project)

Viewpoint	Impact Intensity Discussion	Impact Determination
(#1) Southern boundary of the Union Heights Neighborhood	Redevelopment efforts would consist of new arrival/departure rail tracks within an industrial area that contains existing rail tracks and activity. Impact intensity would be Level 4 in conjunction with the Low Viewer Sensitivity.	Negligible
(#2) Intersection of Baxter Street and Spruill Avenue	Wide-span gantry cranes would be visible, and other project features, such as the earthen berm may be visible above existing vegetation and trees by drivers. Impact intensity would be Level 3 in conjunction with the Low Viewer Sensitivity.	Negligible
(#3) Chicora-Cherokee residential neighborhood east of Spruill Avenue	Increased lighting on the project site and from train activity would increase illumination during nighttime hours. Wide-span gantry cranes, stacked containers, and other project features, such as the earthen berm, would be visible by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#4) Chicora-Cherokee residential neighborhood west of Spruill Avenue	Wide-span gantry cranes, stacked containers, and other project features, such as the earthen berm, would be visible by residents and drivers. Increased lighting on the project site and from train activity would increase illumination during nighttime hours. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#5) Intersection of McMillan Avenue and Spruill Avenue	Wide-span gantry cranes, stacked containers, the new Cosgrove-McMillan overpass, and other project features, such as the earthen berm, would be visible by residents and drivers. Increased lighting on the project site and from train activity would increase illumination during nighttime hours. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#6) River Place and Horizon Village facing east across Spruill Avenue	Wide-span gantry cranes would be visible in the distance on the project site above existing vegetation and trees by residents and drivers. Impact intensity would be Level 4 in conjunction with the Moderate Viewer Sensitivity.	Negligible

Viewpoint	Impact Intensity Discussion	Impact Determination
(#7) Riverfront Park and Noisette Creek east of Spruill Avenue	Residents and drivers would see new rail bridge and train activity across Noisette Creek; recreationists would not likely be able to see wide-span gantry cranes while on Noisette Creek. Impact intensity would be Level 4 in conjunction with the High Viewer Sensitivity.	Minor Adverse

#### 4.11.4 Alternative 2: Proposed Project Site (CSX – South via Milford / NS –North via S-Line)

Construction and operation activities under Alternative 2 would be similar to those identified under Alternative 1 (Proposed Project), with the exception that the northern arrival/departure track would utilize the in-active CSX ROW along Spruill Avenue and tie into the NCTC rail line at the Bexley Street corridor before linking into the existing rail along Virginia Avenue.

**Scenic Views:** Under Alternative 2, impacts to scenic views would be similar to Alternative 1 (Proposed Project), which resulted in a minor, permanent adverse impact from construction of a new rail bridge across Noisette Creek, and new train activity.

**Scenic Resources:** Under Alternative 2, the northern rail connection for NS would be relocated along Spruill Avenue within existing CSX ROW. The scenic resources in the CNH Historic District and the USMS Barracks would be avoided. Mature tree removal would still occur across the project site and along the Chicora-Cherokee neighborhood, and would be a Level 3 impact intensity. With the moderate viewer sensitivity, there would be a minor adverse impact to scenic resources.

**Visual Quality and Character:** Under Alternative 2, impacts to visual quality and character would be similar to those identified under Alternative 1 (Proposed Project), with the exception that there would be no major adverse impact to visual quality and character resulting from the loss of historic properties within the Hospital District. Instead, there would be a moderate, permanent adverse impact to visual quality and character from the placement of new vertical elements (e.g., wide-span gantry cranes and the Cosgrove-McMillan Overpass) into the VRSA.

**Light and Glare:** Under Alternative 2, light and glare impacts resulting from the high-mast lights on the ICTF would be similar to those under Alternative 1 (Proposed Project). Impacts from train head lamps at night would still occur at curvatures of the northern arrival/departure tracks; however, affected residences would include those near the St. Johns – McMillan Street intersection, those along St Johns Avenue and Spruill Avenue, and those located adjacent to Bexley Street and Aragon Avenue. Unlike Alternative 1 (Proposed Project), most residences within the Hospital District would not be subjected to nighttime train headlamps because of the intervening vegetation and structures.

**Selected Viewpoints:** Under Alternative 2, impacts associated with selected viewpoints would be the same for viewpoints #1-5, and #7. For viewpoint #6, the presence of intermittent trains using the in-active CSX ROW along Spruill Avenue would result in an increased impact intensity of Level 3 because of the more numerous viewers along Spruill Avenue (e.g., motorists). With the moderate viewer sensitivity for the area, the increased train activity would result in a minor adverse impact.

#### 4.11.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

Construction and operation activities under Alternative 3 would be similar to those identified under Alternative 1 (Proposed Project), with the exception that the CSX arrival and departure would pass through Kingsworth Avenue.

**Scenic Views:** Under Alternative 3, impacts to scenic views would be the same as Alternative 1 (Proposed Project), which resulted in a minor, permanent adverse impact from construction of a new rail bridge across Noisette Creek, and new train activity.

**Scenic Resources:** Under Alternative 3, impacts to scenic resources would be the same as Alternative 1 (Proposed Project), which resulted in a major, permanent adverse impact from the demolition of contributing elements within the CNH historic district and altered setting of the USMC Barracks.

**Visual Quality and Character:** Under Alternative 3, impacts to visual quality and character would be the same as Alternative 1 (Proposed Project), which resulted in a major, permanent adverse impact from the demolition of contributing elements within the CNH historic district and altered setting of the USMC Barracks.

**Light and Glare:** Under Alternative 3, light and glare impacts resulting from the high-mast lights on the ICTF and nighttime train activity would be the same as Alternative 1 (Proposed Project), which resulted in a minor, permanent adverse impact.

**Selected Viewpoints:** Under Alternative 3, impacts associated with selected viewpoints would be the same for viewpoints #1-7.

#### 4.11.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

Construction and operation activities under Alternative 3 would be similar to those identified under Alternative 1 (Proposed Project), with the exception that the NS train arrival and departure would be located at the southern end of the ICTF and parallel the CSX route to Milford Street.

**Scenic Views:** Under Alternative 4, there would be no impact to scenic views as ICTF construction and operation activities would occur south of any identified scenic views in the VRSA.



**Scenic Resources:** Under Alternative 4, impacts to scenic resources would be limited to a minor adverse impact as a result of the loss of mature trees.

**Visual Quality and Character:** Under Alternative 4, impacts to visual quality and character would be similar to Alternative 1 (Proposed Project), with the exception that there would be no major adverse impact to visual quality and character resulting from the loss of historic properties within the Hospital District. Instead, there would be a moderate, permanent adverse impact to visual quality and character from the placement of new vertical elements (e.g., wide-span gantry cranes and high mast lighting) into the VRSA.

**Light and Glare:** Under Alternative 4, light and glare impacts resulting from the high-mast lights on the ICTF would be the same as Alternative 1 (Proposed Project), which resulted in a minor, permanent adverse impact. Nighttime train activity would result in a negligible impact as there would be few curvatures on the southern route to Milford Street where residences would be affected.

**Selected Viewpoints:** Under Alternative 4, impacts associated with selected viewpoints would be the same for viewpoints #1-6. There would be no impact to viewpoints #7 as there would be no construction or ICTF train activity across Noisette Creek or in the immediate vicinity.

#### 4.11.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

Construction and operation activities under Alternative 5 would be similar to those identified under Alternative 1 (Proposed Project), with the exception that the ICTF would be located at the River Center project site, and there would not be the need for a Cosgrove-McMillan Overpass nor a road realignment of North Hobson/Bainbridge Avenue.

**Scenic Views:** Under Alternative 5, there would be Level 1 impact to scenic views around Noisette Creek as the Navy Base ICTF construction and operations would be adjacent to the creek. With the high viewer sensitivity at this location, a major, permanent adverse impact to scenic views would occur.

**Scenic Resources:** Under Alternative 5, the overall impact to scenic resources would be similar to Alternative 1 (Proposed Project), resulting in a major, permanent adverse impact; however, in addition, two additional historic districts, the CNY and CNYOQ, would be adversely impacted and the USMC Barracks would be demolished. Contributing elements of the CNY would be demolished, and its visual setting altered, and the visual setting of the CNYOQ would be altered.

**Visual Quality and Character:** Under Alternative 5, the overall impacts to visual quality and character would be similar to Alternative 1 (Proposed Project), including the major, permanent adverse impact to visual quality and character from the demolition of contributing elements of

historic districts within the Hospital District (CNH and CNY), demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.

**Light and Glare:** Under Alternative 5, light and glare impacts resulting from the high-mast lights on the ICTF would be the same as Alternative 1 (Proposed Project), which resulted in a minor, permanent adverse impact. Nighttime train activity would result in a negligible impact as there would be few curvatures on the southern route to Milford Street where residences would be affected, including the Chicora-Cherokee neighborhood.

**Selected Viewpoints:** Redevelopment efforts under Alternative 1 (Proposed Project) would have adverse impacts to the selected viewpoints. Table 4.11-6 identifies the impact determination for each selected viewpoint as well as the rationale for the determination.

Table 4.11-6  
Impact Determinations for Selected Viewpoints, Alternative 5

Viewpoint	Impact Intensity Discussion	Impact Determination
(#1) Southern boundary of the Union Heights Neighborhood	Redevelopment efforts would consist of new arrival/departure trail tracks within an industrial area that contains existing rail tracks and train activity. Impact intensity would be Level 4 in conjunction with the Low Viewer Sensitivity.	Negligible
(#2) Intersection of Baxter Street and Spruill Avenue	Wide-span gantry cranes may be visible in the distance to the north above existing vegetation and trees by drivers. Impact intensity would be Level 4 in conjunction with the Low Viewer Sensitivity.	Negligible
(#3) Chicora-Cherokee residential neighborhood east of Spruill Avenue	Increased lighting from drayage road and train activities would increase illumination during nighttime hours, though it would be mostly blocked by existing trees and vegetation. Wide-span gantry cranes may be visible in the distance to the north above existing vegetation and trees by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#4) Chicora-Cherokee residential neighborhood west of Spruill Avenue	Wide-span gantry cranes may be visible in the distance to the north above existing vegetation and trees by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse

Viewpoint	Impact Intensity Discussion	Impact Determination
(#5) Intersection of McMillan Avenue and Spruill Avenue	Wide-span gantry cranes, stacked containers, and other project features would be visible by residents and drivers. Increased lighting on the project site and from train activity would increase illumination during nighttime hours. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity	Minor Adverse
(#6) River Place and Horizon Village facing east across Spruill Avenue	Wide-span gantry cranes would be visible in the distance on the project site above existing vegetation and trees by residents and drivers. Impact intensity would be Level 3 in conjunction with the Moderate Viewer Sensitivity.	Minor Adverse
(#7) Riverfront Park and Noisette Creek east of Spruill Avenue	Residents and drivers would see new rail bridge and train activity across Noisette Creek, as well as other elements of the ICTF such as container stacking and wide-span gantry cranes. Impact intensity would be Level 1 in conjunction with the High Viewer Sensitivity.	Major Adverse

#### 4.11.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

Construction and operation activities under Alternative 6 would be similar to those identified under Alternative 5, with the exception that the CSX train arrival and departure would pass through Kingsworth Avenue.

**Scenic Views:** Under Alternative 6, impacts to scenic views would be the same as Alternative 5, which resulted in a major, permanent adverse impact from the placement of the ICTF alongside a portion of Noisette Creek.

**Scenic Resources:** Under Alternative 6, impacts to scenic resources would be the same as Alternative 5, which resulted in a major, permanent adverse impact from the demolition of contributing elements of historic districts within the Hospital District (CNH and CNY), demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.

**Visual Quality and Character:** Under Alternative 6, the overall impact to visual quality and character would be similar to Alternative 5, which resulted in a major, permanent adverse impact to visual quality and character from the demolition of contributing elements of historic districts within the Hospital District (CNH and CNY), demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.



**Light and Glare:** Under Alternative 6, light and glare impacts resulting from the high-mast lights on the ICTF would be the same as Alternative 5, which resulted in a minor, permanent adverse impact. Nighttime train activity would result in a negligible impact as there would be few curvatures on the southern route to Kingsworth Avenue where residences would be affected, including the Chicora-Cherokee neighborhood.

**Selected Viewpoints:** Under Alternative 6, impacts associated with selected viewpoints would be the same for viewpoints #1-7 as those under Alternative 5.

#### 4.11.9 Alternative 7: River Center Project Site (CSX & NS – South to Milford)

Construction and operation activities under Alternative 7 would be similar to those identified under Alternative 5, with the exception that the NS train arrival and departure would be located at the southern end of the ICTF and parallel the CSX route to Milford Street.

**Scenic Views:** Under Alternative 6, impacts to scenic views would be the same as Alternative 5, which resulted in a major, permanent adverse impact from the placement of the ICTF alongside a portion of Noisette Creek.

**Scenic Resources:** Under Alternative 6, impacts to scenic resources would be the same as Alternative 5, which resulted in a major, permanent adverse impact from the demolition of contributing elements of historic districts within the Hospital District (CNH and CNY), demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.

**Visual Quality and Character:** Under Alternative 6, the overall impact to visual quality and character would be similar to Alternative 5, which resulted in a major, permanent adverse impact to visual quality and character from the demolition of contributing elements of historic districts within the Hospital District (CNH and CNY), demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.

**Light and Glare:** Under Alternative 6, light and glare impacts resulting from the high-mast lights on the ICTF would be the same as Alternative 5, which resulted in a minor adverse impact. Nighttime train activity would result in a negligible impact as there would be few curvatures on the southern route to Kingsworth Avenue where residences would be affected, including the Chicora-Cherokee neighborhood.

**Selected Viewpoints:** Under Alternative 6, impacts associated with selected viewpoints would be the same for viewpoints #1-7 as those under Alternative 5.

#### 4.11.10 Related Activities

If the Proposed Project is constructed, a section of unimproved CSX ROW would have to be activated with rail lines that would accept intermodal trains at the proposed new at-grade crossing at Meeting Street in the vicinity of Herbert Street. This Related Activity would apply to Alternatives 1, 2, 4, 5, and 7. This new at-grade crossing would result in a Level 3 impact intensity, and with moderate viewer sensitivity for the area, result in a minor, permanent adverse impact on visual quality and character of the VRSA.

Under Alternatives 3 and 6, the Related Activity construction would begin at the proposed new at-grade crossing at Meeting Street in the vicinity of Kingsworth Avenue. This new at-grade crossing would result in a Level 3 impact intensity, and with moderate viewer sensitivity for the area, result in a minor, permanent adverse impact on visual quality and character of the VRSA.

Alternative 2 requires the reactivation of an out-of-service ROW and construction of a new railroad bridge to connect the NS arrival/departure tracks from the ICTF across a portion of marsh which drains to Noisette Creek to the existing NCTC track along Virginia Avenue. This new railroad bridge would be built parallel to an existing rail tressle bridge, and as such would be a Level 4 impact intensity. With high viewer sensitivity, it would result in a minor, permanent adverse impact to the Noisette Creek scenic view.

#### 4.11.11 Summary of Impacts Table

Table 4.11-7 provides a summary of impacts on visual resources and aesthetics.

Table 4.11-7  
Summary of Impacts, Visual Resources and Aesthetics

Alternative	Scenic Views	Scenic Resources	Visual Quality and Character	Light and Glare
<b>No-Action</b>	No impact to scenic views.	Minor adverse impact to scenic resources through the removal of mature trees.	Potential minor beneficial impacts to visual quality and character from redevelopment efforts as vacant parking lots and other areas are replaced with newer built structures and associated landscaping.	No impact from light and glare.
<b>Alternative 1: Applicant's Proposed Project (CSX – Milford / NS – Hospital District)</b>	Minor, permanent adverse impact to scenic views from construction of new rail bridge (adjacent to an existing rail bridge) over Noisette Creek along Noisette Boulevard.	Major, permanent adverse impact to scenic resources from the removal of contributing structures to the CNH Historic District and mature trees, as well as the altered setting of the USMC Barracks.	<p>Moderate, permanent adverse impact from new vertical elements in the VRSA (wide-span gantry cranes, high mast lighting, Cosgrove-McMillan Overpass).</p> <p>Negligible impact from construction of new built structures on the ICTF.</p> <p>Minor adverse impact from the removal of mature trees.</p> <p>Major, permanent adverse impact from demolition of contributing elements of the CNH historic district and altered setting of the USMC Barracks.</p> <p>Minor, permanent adverse impact from construction of new rail bridge (adjacent to an existing rail bridge) over Noisette Creek.</p> <p>Negligible impact from the arrival/departure tracks to the south of the ICTF.</p> <p>Negligible impact from the realignment of Hobson Ave/Bainbridge Ave and construction of the drayage road; minor, permanent adverse impact from the removal of the Viaduct Road Overpass.</p> <p>Minor, permanent adverse impact from the construction of the earthen berm adjacent to the Chicora-Cherokee neighborhood.</p>	Minor, permanent adverse impact from light and glare associated with the new 85-foot-tall mast lighting that will be illuminated from dusk to dawn, and from nighttime train head lamps.



Alternative	Scenic Views	Scenic Resources	Visual Quality and Character	Light and Glare
<b>Alternative 2: Proposed Project Site (CSX –Milford / NS – S-Line)</b>	Minor, permanent adverse impact to scenic views from construction of a new rail bridge over Noisette Creek along Spruill Avenue.	Minor adverse impact to scenic resources from the removal of mature trees.	Similar impacts to visual quality and character as described under Alternative 1 (Proposed Project), but no impact to CNH historic district and USMC Barracks. Moderate, permanent adverse impact from new vertical elements in the VRSA (wide-span gantry cranes, high mast lighting, and the Cosgrove-McMillan Overpass).	Similar impacts from light and glare as those described under Alternative 1 (Proposed Project), resulting in a minor, permanent adverse impact from high mast lighting and nighttime train head lamps.
<b>Alternative 3: Proposed Project Site (CSX – Kingsworth / NS – Hospital District)</b>	Same impact to scenic views as Alternative 1 (Proposed Project), resulting in a minor, permanent adverse impact from the new rail bridge over Noisette Creek.	Same impacts to scenic resources as Alternative 1 (Proposed Project), resulting in a major, permanent adverse impact from the removal of contributing structures to the CNH Historic District and mature trees, as well as the altered setting of the USMC Barracks.	Same impacts to visual quality and character as Alternative 1 (Proposed Project), including the major, permanent adverse impact from the removal of contributing structures to the CNH Historic District and mature trees, as well as the altered setting of the USMC Barracks.	Same impacts from light and glare as those described under Alternative 1 (Proposed Project), resulting in a minor, permanent adverse impact from high mast lighting and nighttime train head lamps.
<b>Alternative 4: Proposed Project Site (CSX &amp; NS – Milford)</b>	No impact to scenic views.	Minor adverse impact to scenic resources from the removal of mature trees.	Similar impacts to visual quality and character as described under Alternative 1 (Proposed Project), but no impact to CNH historic district and USMC Barracks. Moderate, permanent adverse impact from new vertical elements in the VRSA (wide-span gantry cranes and high mast lighting).	Minor, permanent adverse impact from light and glare associated with high mast lighting, but negligible effect resulting from nighttime train head lamps due to lack of curvatures (and affected residences) on the southern arrival/departure tracks.
<b>Alternative 5: River Center Project Site (CSX –Milford / NS-Hospital District)</b>	Major, permanent adverse impact on viewer sensitivity to scenic views from construction of new rail bridge (adjacent to an existing rail bridge) near Noisette Boulevard and placement of the ICTF adjacent to Noisette Creek.	Major, permanent adverse impact to scenic resources from the removal of contributing elements to the CNH and CNY historic districts, the USMC Barracks, and mature trees, as well as the altered setting associated with the CNH, CNY, and CNYOQ historic district.	The overall impacts to visual quality and character would be similar to Alternative 1 (Proposed Project), including the major, permanent adverse impact to visual quality and character from the demolition of contributing elements of to the CNH and CNY historic districts, demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.	Minor, permanent adverse impact from light and glare associated with high mast lighting, but negligible effect resulting from nighttime train head lamps due to lack of curvatures (and affected residences) on the southern arrival/departure tracks.

Alternative	Scenic Views	Scenic Resources	Visual Quality and Character	Light and Glare
<b>Alternative 6: River Center Project Site (CSX – Kingsworth / NS-Hospital District)</b>	Same impact to scenic views as Alternative 5, resulting in a major, permanent adverse impact from construction of new rail bridge (adjacent to an existing rail bridge) near Noisette Boulevard over Noisette Creek and placement of the ICTF adjacent to Noisette Creek.	Same impacts to scenic resources as Alternative 5, resulting in a major, permanent adverse impact from the removal of contributing elements to the CNH and CNY historic districts, the USMC Barracks, and mature trees, as well as the altered setting associated with the CNH, CNY, and CNYOQ historic district.	The overall impacts to visual quality and character would be similar to Alternative 5, including the major, permanent adverse impact to visual quality and character from the demolition of contributing elements of to the CNH and CNY historic districts, demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.	Similar impact from light and glare as those described under Alternative 5, resulting in a minor, permanent adverse impact associated with high mast lighting, but negligible effect resulting from nighttime train head lamps due to lack of curvatures (and affected residences) on the southern arrival/departure tracks.
<b>Alternative 7: River Center Project Site (CSX &amp; NS Milford)</b>	Same impact to scenic views as Alternative 5, resulting in a major, permanent adverse impact from construction of new rail bridge (adjacent to an existing rail bridge) near Noisette Boulevard over Noisette Creek and placement of the ICTF adjacent to Noisette Creek.	Same impacts to scenic resources as Alternative 5, resulting in a major, permanent adverse impact from the removal of contributing elements to the CNH and CNY historic districts, the USMC Barracks, and mature trees, as well as the altered setting associated with the CNH, CNY, and CNYOQ historic district.	The overall impacts to visual quality and character would be similar to Alternative 5, including the major, permanent adverse impact to visual quality and character from the demolition of contributing elements of to the CNH and CNY historic districts, demolition of the USMC Barracks, and altered settings of the CNH, CNY, and CNYOQ.	Similar impact from light and glare as those described under Alternative 5, resulting in a minor, permanent adverse impact associated with high mast lighting, but negligible effect resulting from nighttime train head lamps due to lack of curvatures (and affected residences) on the southern arrival/departure tracks.

## 4.11.12 Mitigation

### 4.11.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Construct a landscaped earthen berm along the length of the processing and classification railroad tracks adjacent to the Chicora-Cherokee Neighborhood. (Minimization)
- Provide photometric design for facility high-mast lighting to less than 0.5 foot-candles outside of property boundary. (Minimization)
- Direct operating lights downward and shield light sources to minimize light impacts to adjacent areas. (Minimization)
- Install landscaping within and around the facility footprint to reduce visual impacts. (Minimization)
- Replace significant and/or grand trees under City of North Charleston tree ordinance and/or payment to the tree bank account and adhere to any zoning requirements for tree plantings along building setbacks and road frontages. (Minimization)
- Project locomotive shop and administrative buildings will incorporate architectural elements from historic naval buildings to maintain and enhance aesthetics. (Minimization)

These avoidance and minimization measures, except the items noted with an asterisk (\*), have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Navy Base ICTF is provided in Chapter 6, Table 6-1.

### 4.11.12.2 Additional Potential Mitigation Measures

No additional mitigation measures have been identified by the Corps.



## 4.12 NOISE AND VIBRATIONS

### 4.12.1 Methods and Impact Definitions

The project alternatives are expected to generate additional automobile and truck traffic; alter automobile and truck traffic patterns; alter the existing railway network with additional future tracks and at-grade rail crossings; change the number of freight train operations along certain track segments; and introduce operational noise. These changes have the potential to cause traffic noise impacts, rail noise and vibration impacts, and operational noise impacts for land uses located adjacent to the components of the Proposed Project. The following sections provide a summary of the methods used and impact definitions for the various noise sources and vibration.

#### 4.12.1.1 Traffic Noise Methodology and Impact Thresholds

A noise screening procedure, which is detailed in Appendix H, was developed in order to determine road segments within the study area where the project alternatives may cause a traffic noise impact. As a result, seven road segments were identified for detailed noise modeling and are shown in Figure 4.12-1<sup>37</sup>:

- Montague Avenue between Spruill Avenue and Virginia Avenue;
- Virginia Avenue between Montague Avenue and Buist Avenue;
- Noisette Boulevard between Twiggs Street and McMillan Avenue;
- Cosgrove Avenue (SC-7) between Spruill Avenue and Rivers Avenue;
- Spruill Avenue between Noisette Creek and N. Carolina Avenue;
- St. Johns Avenue between O'Hear Avenue and McMillan Avenue;
- Port drayage road (future) between Port access road and NBIF.

For the detailed analysis, 150 noise-sensitive receptor locations were identified for the project alternatives, representing mostly residential land uses (single- and multi-family residences), as well as churches, schools, parks and recreation areas. Several commercial areas and vacant lots exposed to traffic noise were also included for informational purposes. An additional eighteen receptors located adjacent to the proposed Port drayage road under Alternatives 5, 6, and 7 were also identified for noise modeling. The locations of these receptors are presented in Appendix H.

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<sup>37</sup> For modeling purposes, in Figure 4.12-1, St. Johns Avenue was split into two segments and Spruill Avenue was divided into seven segments. Some road segments also share boxes in the figure. This is why there are twelve boxes used to represent seven road segments in the figure.



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Noise predictions for each project alternative were computed using the FHWA's Traffic Noise Model (TNM), version 2.5 (2004). For more information on the TNM software and its inputs and outputs, see Appendix H. The primary output from TNM is the hourly average sound level (Leq(h)) for each receptor location. Prior to conducting noise modeling for the project alternatives, the TNM predictions were validated for the study area. Further details regarding the noise model validation process can be found in Appendix H.

The evaluation of traffic noise for the Proposed Project generally follows the NEPA process as discussed in *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011a). To determine whether a proposed build alternative would generate noise impacts, the proposed build alternative is compared with a baseline, in this case the future No-Action Alternative. An impact occurs if the Proposed Project or alternative changes the noise levels when compared to the No-Action Alternative for the same design year. For the purpose of this noise analysis, the levels of traffic noise impact associated with a build alternative in comparison with the No-Action Alternative (for the same year) are defined as follows:

Table 4.12-1  
Impact Definitions, Traffic Noise

Negligible <sup>38</sup>	Minor	Moderate	Major
0 – 3 dB(A) increase in Leq(h)	3 – 5 dB(A) increase in Leq(h)	5 – 10 dB(A) increase in Leq(h)	Increase in Leq(h) greater than 10 dB(A)

#### 4.12.1.2 Rail Noise Methodology and Impact Thresholds

A screening procedure to identify track segments for further analysis was developed utilizing information obtained from the Transportation Study (see Section 4.8) and Palmetto Railways. Noise levels were computed using the procedure for general noise assessment documented in *Transit Noise and Vibration Impact Assessment* (FTA, 2006) and the CREATE railroad noise model (refer to Appendix H for more information on the screening procedure and the CREATE railroad noise model). The model output is the Day-Night Average Sound Level (DNL) value of rail noise at a specific distance from the track to the receptor. Segments identified as a result of the screening procedure were further reviewed for the presence of noise-sensitive land uses within 300 feet<sup>39</sup> of the track centerline. If no noise-sensitive land uses were present within this screening distance, then no further noise assessment was necessary for these track segments.

<sup>38</sup> Changes of 3 dB(A) or less are barely perceptible to the human ear (FHWA, 2011).

<sup>39</sup> A screening distance of 300 feet covers the first two rows of buildings nearest to the tracks. The second and subsequent rows of buildings are more remote and increasingly shielded from rail noise by intervening rows of buildings.



As a result of the screening procedure, ten track segments were identified for further noise analysis and are shown on Figure 4.12-2.

- Segment 1 – North of ID 01 Dorchester Road (existing)
- Segment 2 – Between ID 01 Dorchester Road and ID 02 Accabee Road (existing)
- Segment 3 – Between ID 02 Accabee Road and ID 03 Misroon Street (existing)
- Segment 4 – Between ID 03 Misroon Street and ID 15 Hackemann Avenue (existing)
- Segment 5 – Between ID 14 Avenue B North and ICTF (proposed) [Alternatives 1, 3, 5, and 6]
- Segment 6 – Between ID 19 O'Hear Avenue and ICTF (proposed) [Alternative 2 only]
- Segment 7 – Between ID 15 Hackemann Avenue and ID 16 Discher Street (existing)
- Segment 8 – Between ID 20 Meeting Street and ID 20 Spruill Avenue (proposed) (Alternatives 3 and 6 only)
- Segment 9 – Between ID 20 Spruill Avenue and ICTF (proposed) (Alternatives 3 and 6 only)
- Segment 10 – Between ID 17 Pittsburgh Avenue and ICTF (proposed) (Alternatives 5 and 7 only)

Locomotive horn soundings are part of railroad operations and can contribute to rail noise impacts. Under the Train Horn Rule (49 CFR Part 222), locomotive engineers must begin to sound train warning horns from 15 to 20 seconds in advance of all public grade crossings (for train speeds of 10 mph and below). The rule also provides an opportunity for localities nationwide to mitigate the effects of train horn noise by establishing quiet zones (additional information on quiet zones and proposed quiet zones can be found in Appendix H).

As with the track segments, a screening procedure was developed for horn soundings (see Appendix H for more information on the screening procedure and criteria). Altogether, 26 existing and future rail crossings were modeled for horn soundings following the FTA's procedure (FTA 2006). If noise sensitive receivers are present within 300 feet of the rail crossing with the potential horn noise impact, further analysis was performed for the crossing. The rail crossings listed below met the screening criteria for further analysis (the crossing identification numbers correspond to the locations shown in Figure 4.12-2):

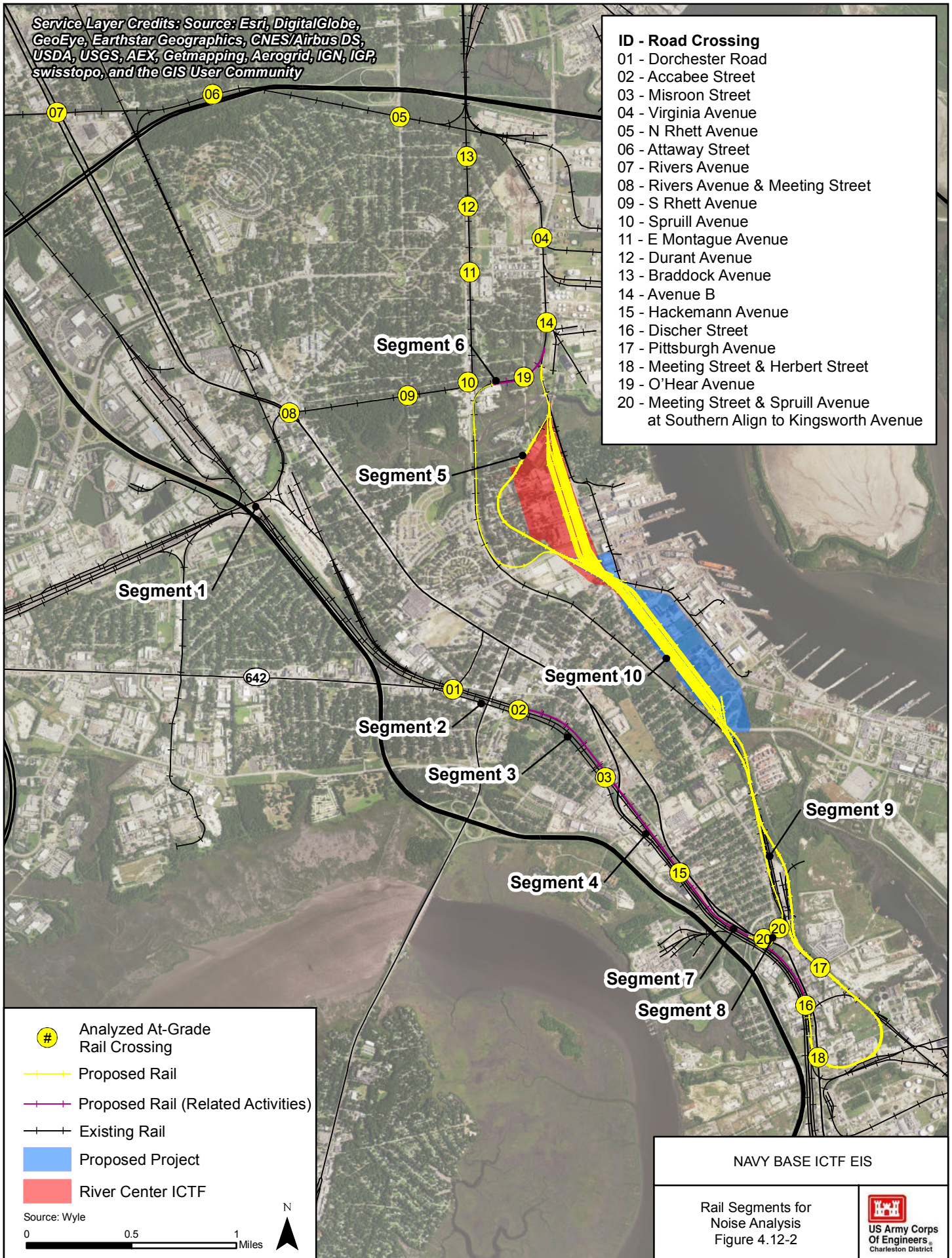
- Dorchester Road
- Accabee Road
- Misroon Street
- Hackemann Avenue
- O'Hear Avenue
- Meeting Street and Spruill Avenue at Southern Alignment



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

#### ID - Road Crossing

- 01 - Dorchester Road
- 02 - Accabee Street
- 03 - Misroon Street
- 04 - Virginia Avenue
- 05 - N Rhett Avenue
- 06 - Attaway Street
- 07 - Rivers Avenue
- 08 - Rivers Avenue & Meeting Street
- 09 - S Rhett Avenue
- 10 - Spruill Avenue
- 11 - E Montague Avenue
- 12 - Durant Avenue
- 13 - Braddock Avenue
- 14 - Avenue B
- 15 - Hackemann Avenue
- 16 - Discher Street
- 17 - Pittsburgh Avenue
- 18 - Meeting Street & Herbert Street
- 19 - O'Hear Avenue
- 20 - Meeting Street & Spruill Avenue at Southern Align to Kingsworth Avenue





## Noise Prediction Model and Analysis

The DNL contours along the selected track segments and at-grade crossings were predicted using a combination of the CREATE Railroad Noise Model (HMMH, 2006) and the FTA's equation for horn noise level prediction. Information on the assumptions and parameters used for the modeling can be found in Appendix H.

The resultant output from the train noise and horn noise prediction models was the location of the DNL 70, 65, and 60 dB(A) noise contours in the vicinity of the modeled rail crossings for both the No-Action and build alternatives for 2038. The contours in the vicinity of a rail crossing are representative of the horn sounding in addition to the train passbys. It should be noted that the contours in the vicinity of the rail crossings represent a 24-hour average of the noise levels that can be expected as a result of locomotive horn soundings. Refer back to Figure 3.12-4 for a representation of the noise level contours that would be expected as a result of an individual incident of a locomotive horn sounding.

The evaluation of potential rail noise impact follows the NEPA process for environmental analyses, as applied to the traffic noise impact assessment. Similarly, a proposed build alternative is compared with a baseline (the No-Action Alternative) to determine whether or not the proposed build alternative would generate noise impacts. The Proposed Project or alternative would cause an impact if it changes the noise levels compared to the No-Action Alternative for the same design year.

Table 4.12-2  
Impact Definitions, Rail Noise

Negligible	Minor	Moderate	Major
0 – 3 dB(A) increase in Leq(h)	3 – 5 dB(A) increase in Leq(h)	5 – 10 dB(A) increase in Leq(h)	Increase in Leq(h) greater than 10 dB(A)

### 4.12.1.3 Rail Vibration Methodology and Impact Thresholds

Ground-borne vibration of high amplitude may cause buildings to shake and rumbling sounds to be heard. Vibration from sources such as trucks and buses is not usually perceptible, even in locations close to major roads. However, it is not uncommon for freight trains to be the source of intrusive ground-borne vibration (refer back to Section 3.12 for more information on the characteristics of vibration). Vibration analysis for the selected receptors along the track segments was performed following procedures for rail transit systems (FTA 2006), with adjustments appropriate for freight trains. For more information on the approach used in the vibration assessment, see Appendix H.



Potential vibration impacts are analyzed in this study for freight railroads in the study area; however, no specific impact criteria exist for freight railroads. Vibration impact criterion for a single freight train passby event is established following the FTA's manual (FTA 2006, Table 8-1). The impact criteria for ground borne vibration are shown in Table 4.12-3.

Table 4.12-3  
Impact Criteria for Ground-Borne Vibration of Freight Train Passby

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)			GBN Impact Levels (dB re 20 micro Pascals)		
	Frequent Events <sup>1</sup>	Occasional Events <sup>2</sup>	Infrequent Events <sup>3</sup>	Frequent Events <sup>1</sup>	Occasional Events <sup>2</sup>	Infrequent Events <sup>3</sup>
Category I: Buildings where vibration would interfere with interior operations	65 VdB <sup>4</sup>	65 VdB <sup>4</sup>	65 VdB <sup>4</sup>	N/A <sup>4</sup>	N/A <sup>4</sup>	N/A <sup>4</sup>
Category II: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category III: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Notes:

1. "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
3. "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
5. Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

Following the FTA recommendation, the ground-borne vibration level of 80 VdB from infrequent train passby events typical for the project alternatives is considered the impact criterion for vibration-sensitive land uses such as residences and other buildings where people normally sleep (Category 2). Unlike the relative noise impact criteria that are based on a comparison of the future build alternatives with the No-Action Alternative, the vibration impact criterion is "absolute" in that the vibration impact is likely when a build alternative's predicted vibration level exceeds the vibration velocity threshold indicated above. Also in contrast to the aggregate Leq or DNL metrics

used for the noise impact criteria, which combine multiple noise events within a certain time period, the vibration impact criterion applies to individual train passby events.

It should be noted that the vibration analysis is based on the ground-borne vibration levels calculated for the straight-line track alignments and well-maintained systems. Curved track alignments are known to generate higher vibration levels. However, there is no existing methodology for modeling vibration from curved rail tracks.

Potential rail vibration impacts were evaluated for land uses identified along the selected railway segments and included seventy-six receptors. These locations can be found in Appendix H. Based on the evaluation, it was determined that receptors located at a distance less than 20 feet from the track centerline would experience rail vibration impacts.

A special case of vibration-sensitive receptors in the study area are cultural resources, in particular historic properties reviewed in Section 3.10. The main concern for historic buildings is potential impacts to the masonry from ground-borne vibration generated by train operations. Generally, it is extremely rare for vibration from train operations to cause any sort of building damage, even minor cosmetic damage. However, there is sometimes concern about damage to historic buildings. Even in these cases, damage is unlikely except when the track would be very close to the structure. For this analysis, a vibration damage threshold of 94 VdB was applied to regular masonry buildings and 90 VdB was applied to buildings extremely susceptible to vibration damage (FTA 2006, Table 12-3).

#### **4.12.1.4 Construction Noise Methodology and Impact Thresholds**

Noise assessment for construction operations is conducted in accordance with the FHWA's Roadway Construction Noise Model (RCNM). Further information regarding noise from construction equipment can be found in Appendix H. No standardized criteria have been developed at a Federal or State level for assessing construction noise impacts. Consequently, criteria are developed on a project-specific basis when local ordinances are not found to apply. Local noise ordinances (Charleston County 2011; North Charleston, SC Code of Ordinances) relate to nuisance and hours of allowed activities, but are not practical for assessing the impact of a major construction project. FTA guidelines for residential land uses is 80 dB(A) from daytime construction activities (FTA 2006, Page 12-8), which is an acceptable impact threshold value for construction noise of a temporary nature. Construction activities at such a level would be clearly audible over the existing ambient noise, but may be tolerable considering temporary nature of the disturbance.

#### **4.12.1.5 Operational Noise Methodology and Impact Thresholds**

Operations of the ICTF either at the project site or River Center project site would generate noise in the surrounding communities (refer back to Section 1.7.2 for a description of the operation activities) and would take place 24 hours a day, seven days a week. Because various noise sources would operate at different distances from the adjacent receptors, adjustments are made to the train, crane,

and container impact noise data to account for the specific distance from the noise sources to the receptors and for the attenuation provided by an earthen berm between the NBIF and the nearest receptors (Proposed Project). Detailed information regarding specific sources of operational noise, such as train and crane operations, can be found in Appendix H.

Operational noise impact from the proposed NBIF facility is based on exterior noise levels and is assessed in comparison with the exterior No-Action Alternative noise levels. Under the No-Action Alternative, construction and operation of the Navy Base ICTF would not occur and there would be no impact generated from the ICTF. There would be the potential for redevelopment of the project site and the River Center project site to include rail-served warehousing and distribution. Detailed rail and traffic projections for the No-Action Alternative are described in Appendix F.

For the analysis of noise impacts generated by new roads and rail segments introduced with the project alternatives in areas where roadways or railroads do not currently exist or are inactive, the No-Action Alternative is defined by the ambient noise levels anticipated in the adjacent community in the design year 2038. Noise impacts generated by operations at the project site or River Center project site are also assessed using estimated No-Action ambient noise levels in the adjacent communities in 2038.

To characterize the existing noise environment in communities near the NBIF locations, noise measurements were conducted in July and August 2014 as detailed in Section 3.12.3. The ambient noise levels measured at 18 locations throughout the Chicora-Cherokee Community varied in the range from approximately 49 to 59 dB(A), with an overall average of 51 dB(A) (see Table 3.12-1). Due to operations of the future rail-served warehousing and distribution center, the ambient noise level in the community is assumed to grow by 2 to 4 dB(A) in 24 years from 2014 to 2038. As a result, the No-Action ambient noise level of approximately 54 dB(A) [ $51 + 3 = 54$ ] is estimated for the community in 2038.

Ambient noise is also assessed for the residential community of CNYOQ Historic District, east of the River Center Site. From the 2014 field noise measurements described in Section 3.12.4 for locations at Manley Avenue (Table 3.12-1, locations M17 and M18), the average existing ambient noise level of 56 dB(A) is estimated for the community. With a 3 dB(A) growth to 2038, the No-Action ambient noise level would be expected to be around 59 dB(A) for this community.

No-Action exterior daytime and nighttime ambient noise levels are shown in Table 4.12-4.



Table 4.12-4  
2038 No-Action Alternative Exterior Ambient Noise Levels

Community	Daytime	Nighttime <sup>40</sup>
Chicora-Cherokee Community	54 db(A)	44 db(A)
CNYOQ Historic District	59 db(A)	49 db(A)

Following the NEPA approach and consistent with the traffic noise impact criteria, the criteria for operational noise impact associated with build project alternatives are based upon comparison with the No-Action Alternative for the 2038 design year and are shown in Table 4.12-5.

Table 4.12-5  
Impact Definitions, Operational Noise

Negligible	Minor	Moderate	Major
0–3 dB(A) increase in Leq(h)	3–5 dB(A) increase in Leq(h)	5 –10 dB(A) increase in Leq(h)	Increase in Leq(h) greater than 10 dB(A)

## 4.12.2 No-Action Alternative

The No-Action Alternative is described in detail in Section 2.4. Evaluation of noise conditions related to the No-Action Alternative is necessary to satisfy NEPA requirements for environmental analyses and evaluate proposed build alternatives in comparison with the No-Action Alternative to determine whether the proposed build alternatives would generate noise and/or vibration impacts. Traffic and rail activities projected for the No-Action Alternative (see Appendix F) were used for the noise impact analyses. However, for the analysis of noise impacts generated by new roads and rail segments introduced with the project alternatives in areas where roadways or railroads do not currently exist or are inactive, the No-Action Alternative is defined by the ambient noise (see Table 4.12-4) and vibration levels anticipated in the adjacent community. In a similar manner, noise impacts generated by operations at the project site or River Center project site are also assessed using estimated No-Action ambient noise levels in the adjacent communities.

### 4.12.2.1 Traffic Noise

The future traffic volumes for the No-Action Alternative reflect the growth rate of traffic not related to the project alternatives that will be generated by various developments in North Charleston, as well as other more remote developments. Table 4.12-6 shows the averaged TNM modeled traffic noise levels the receptors identified for analysis in comparison to existing conditions. Appendix H contains data of the modeled noise levels at each individual receiver.

<sup>40</sup> An adjustment factor of 10 dBA is used for all exterior sound that occurs in the nighttime hours of 10:00 p.m. to 7:00 a.m. to reflect the greater sensitivity of most people to nighttime noise.

Table 4.12-6  
Average Traffic Noise Levels for 2013 Existing Conditions  
and 2038, No-Action Alternative

Description	2013 Existing Loudest-Hour Leq(h), dB(A)	2038 No-Action Loudest-Hour Leq(h), dB(A)
Virginia Avenue	70	72
Spruill Avenue from North Carolina Avenue to Cosgrove Avenue	62	67
Cosgrove Avenue	63	67
Spruill Avenue from Cosgrove Avenue to Noisette Creek	61	65
St. Johns Avenue	54	57
Noisette Boulevard	54	55
North Rhett Avenue	63	67
Montague Avenue	55	55

Consistent with growth of traffic volumes that is not project related, the traffic noise levels for the 2038 No-Action Alternative would exceed the existing 2013 noise levels. As seen in Table 4.12-6, the averaged loudest-hour noise levels for the No-Action Alternative would increase by 0 to 5 dB(A) versus the existing condition for most of the noise receptors; however, the No-Action noise level increase versus existing conditions does not constitute a project-related noise impact. More data on individual receptors can be found in Appendix H.

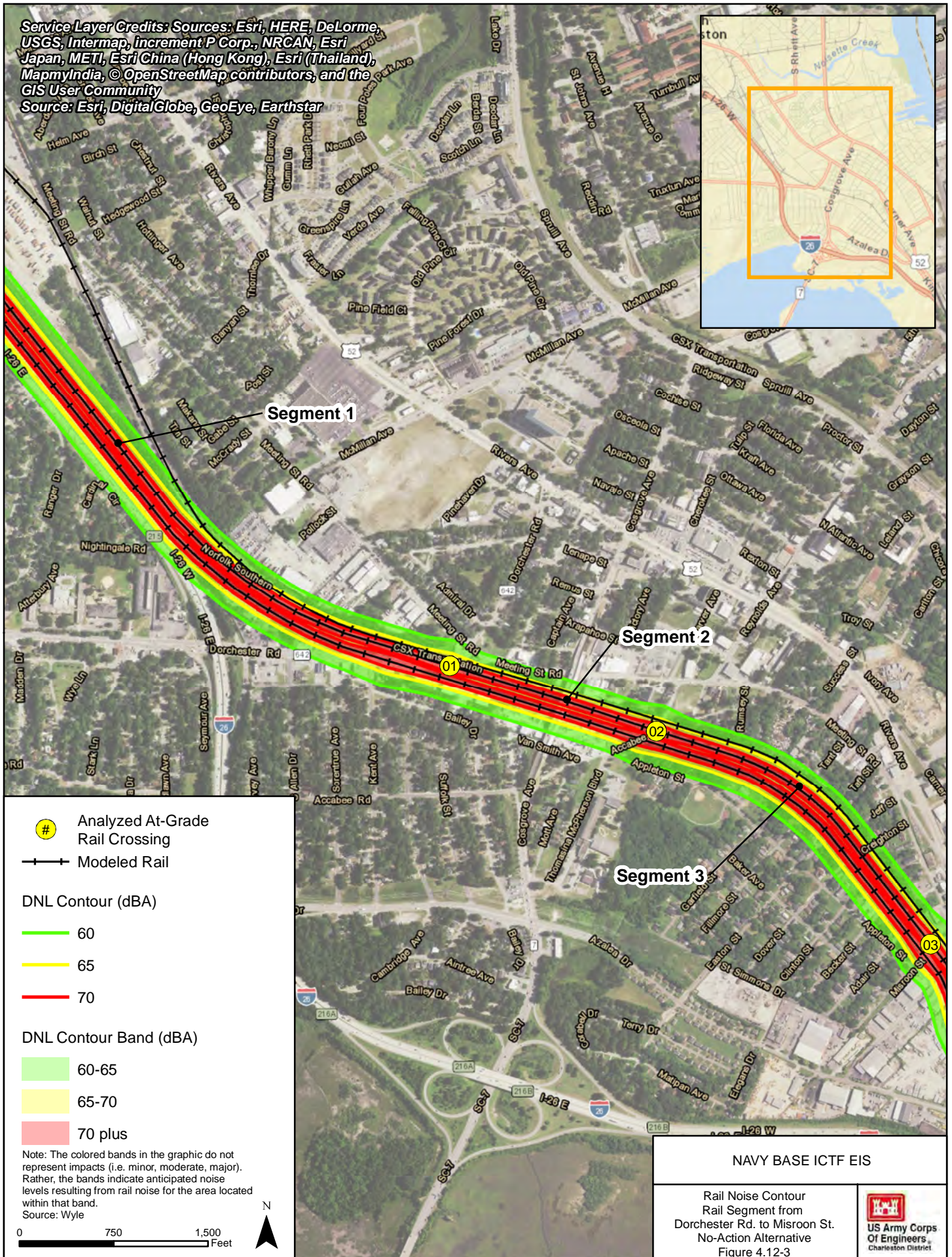
#### 4.12.2.2 Rail Noise

The future rail operations provided in Appendix F for the No-Action Alternative reflect the growing number of train occurrences or increasing average length of trains not related to the project alternatives that would be generated by various developments in North Charleston and elsewhere. Table 4.12-7 shows the computed distance from the rail track centerline to the DNL noise contours along the existing rail segments under the 2038 No-Action Alternative.

To provide a baseline for comparison with the future build alternatives, noise contours for the 2038 No-Action Alternative are reviewed for one existing rail segment, from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3.). Figure 4.12-3 illustrates the DNL noise contours for segments 1, 2, and 3. The noise contours also include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.



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Source: Esri, DigitalGlobe, GeoEye, Earthstar





The No-Action noise level increase versus the existing condition for rail activity does not constitute a noise impact.

Table 4.12-7  
DNL Contour Distance from Track Centerline for 2038, No-Action Alternative

Locations	Rail Segment	Distance (ft) from Track Centerline to DNL Contour of		
		70 dB(A)	65 dB(A)	60 dB(A)
1 – North	North of Dorchester Road (Segment 1)	37	79	170
1 – 2	Dorchester Road to Accabee Road (Segment 2)	37	79	170
2 – 3	Accabee Road to Misroon Street (Segment 3)	37	79	170
3 – 15	Misroon Street to Hackemann Avenue (Segment 4)	37	79	170
4 – 14	North of Virginia Avenue to Avenue B	24	52	112
5 – East	East of North Rhett Avenue	95	205	442
5 – 6	Attaway Street to North Rhett Avenue	78	168	361
6 – 7	Rivers Avenue to Attaway Street	54	117	253
8 – 9	Rivers Avenue/Meeting Street to South Rhett Avenue	60	129	278
9 – 10	South Rhett Avenue to Spruill Avenue	63	135	290
10 – 11	Spruill Avenue to East Montague Avenue	65	141	303
11 – 12	East Montague Avenue to Durant Avenue	74	159	342
12 – 13	Durant Avenue to Braddock Avenue	79	169	365
13 – North	North of Braddock Avenue	83	180	387
14 – 19	Avenue B to O'Hear Avenue	28	61	131
15 – 16	Hackemann Avenue to Discher Street (Segment 7)	29	55	107
16 – 18	Discher Street to Meeting Street	26	56	121

A number of the existing noise-sensitive land uses (defined as residences, schools, churches, hospitals, parks, etc.) would be located within the 2038 No-Action Alternative noise contours from the tracks as the result of the general non-project related developments.

The 2038 No-Action ambient noise levels in the vicinity of the future tracks are estimated below 60 dB(A) DNL. This estimate is based on the field-measured existing noise levels in the study area as described in Section 3.12 and adjusted for the design year 2038.

#### 4.12.2.3 Rail Vibration

The ground-borne vibration levels generated by train activities at the vibration-sensitive receptors along the existing railroad segments would remain steady for the No-Action Alternative for the 2038 design year. Rail vibration effects are unlikely; however, one receptor, a single-family residence at 2312 Taylor Street, is currently located at a distance of 23 feet from the centerline of an existing track

segment. This is very close to the vibration impact threshold distance of 20 feet. Due to this proximity, train activities on the track could potentially generate some vibration effects for the receptor exceeding the vibration impact criterion even under the existing and No-Action conditions.

### 4.12.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

#### 4.12.3.1 Traffic Noise

Table 4.12-8 shows averages of the TNM modeled traffic noise levels for the receptors identified for analysis and compares those with the No-Action noise levels. Specific traffic noise levels at each receptor can be found in Appendix H. The Alternative 1 traffic volumes for some of the road segments (Spruill Avenue, St. Johns Avenue) are predicted lower than for the No-Action Alternative due to projected changes in the traffic patterns (for a description of the changes in traffic patterns under Alternative 1 refer back to Section 4.8.3). Therefore, there is a resulting decrease in noise levels at these locations. Alternative 1 would have a negligible impact on noise levels when compared to the No-Action alternative.

Table 4.12-8  
Average 2038 Traffic Noise Levels for Alternative 1 (Proposed Project) versus the No-Action Alternative

Description	2038 Alternative 1 Loudest-Hour Leq(h), dB(A)	2038 No-Action Loudest-Hour Leq(h), dB(A)	Alternative 1 minus No-Action
Virginia Avenue	74	72	2
Spruill Avenue from North Carolina Avenue to Cosgrove Avenue	64	66	-2
Cosgrove Avenue	68	67	1
Spruill Avenue from Cosgrove Avenue to Noisette Creek	65	65	0
St. Johns Avenue	57	57	0
Noisette Boulevard	55	55	0
North Rhett Avenue	67	67	0
Montague Avenue	55	55	0

#### 4.12.3.2 Rail Noise

The future rail operations (Appendix F) indicate an increased number of train operations and average length of trains under Alternative 1. Table 4.12-9 shows the computed distance from the rail track centerline to the DNL noise contours along the existing and future rail segments under Alternative 1. For instance, under Alternative 1, a receptor located adjacent to rail segment 1 located 68 feet or less

from the rail centerline would have an expected noise level of 70 dBA or greater during train passby events.

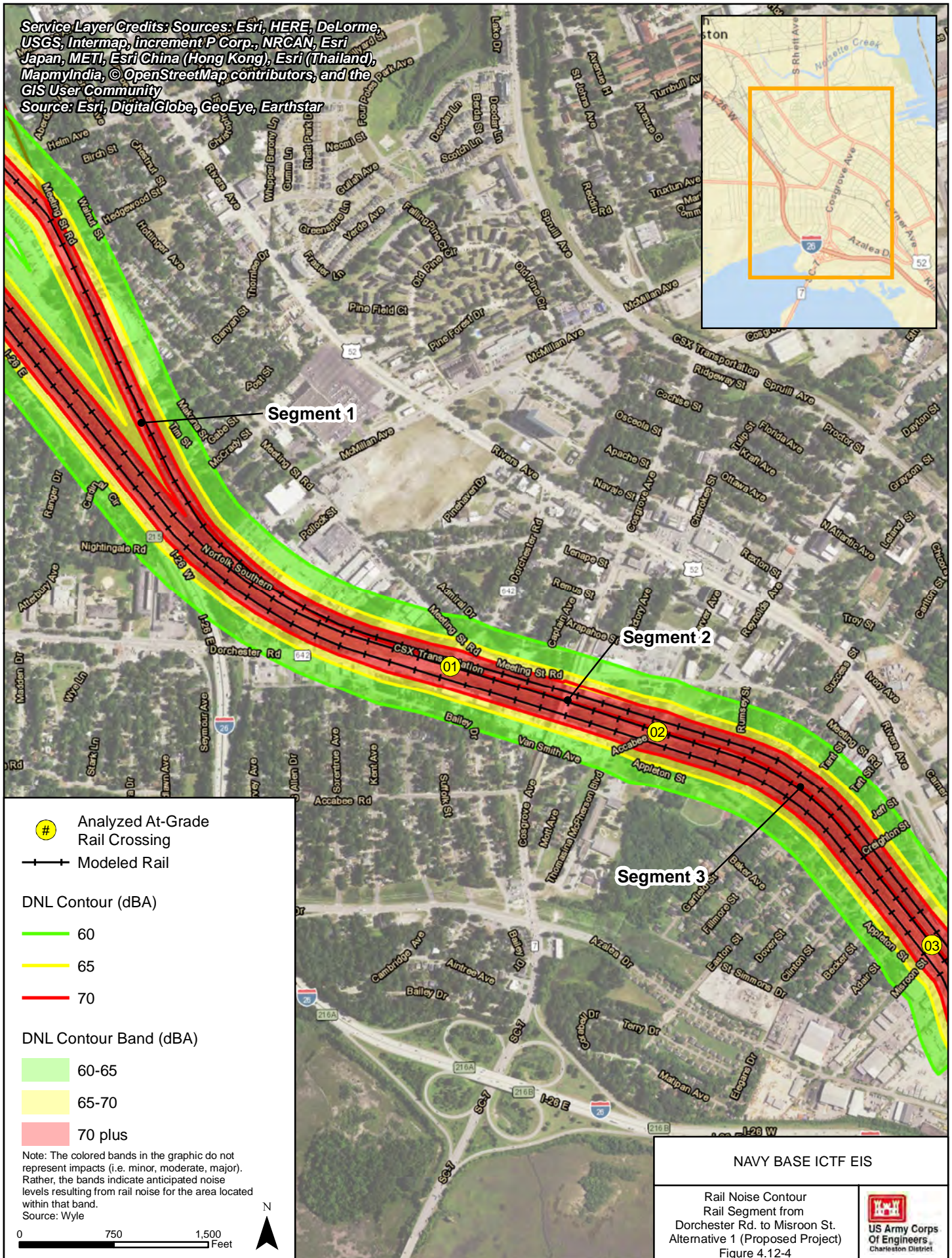
Table 4.12-9  
DNL Contour Distance from Track Centerline for Alternative 1 (Proposed Project)

Locations	Rail Segment	Distance (ft) from Track Centerline to DNL Contour of		
		70 dB(A)	65 dB(A)	60 dB(A)
1 – North	North of Dorchester Road (Segment 1)	68	147	316
1 – 2	Dorchester Road to Accabee Road (Segment 2)	68	147	316
2 – 3	Accabee Road to Misroon Street (Segment 3)	68	147	316
3 – 15	Misroon Street to Hackemann Avenue (Segment 4)	68	147	316
4 – 14	North of Virginia Avenue to Avenue B	41	88	190
5 – East	East of N. Rhett Avenue	90	194	419
5 – 6	Attaway Street to N. Rhett Avenue	79	171	369
6 – 7	Rivers Avenue to Attaway Street	70	151	326
8 – 9	Rivers Avenue/Meeting Street to S. Rhett Avenue	69	149	321
9 – 10	S. Rhett Avenue to Spruill Avenue	72	156	336
10 – 11	Spruill Avenue to E Montague Avenue	76	163	351
11 – 12	E. Montague Avenue to Durant Avenue	85	183	395
12 – 13	Durant Avenue to Braddock Avenue	92	198	426
13 – North	North of Braddock Avenue	97	210	452
14 – ICTF	Avenue B to ICTF (Segment 5)	45	97	208
15 – 16	Hackemann Avenue to Discher Street (Segment 7)	56	113	233
16 – 18	Discher Street to Meeting Street	24	52	112
17 – ICTF	Pittsburgh Avenue to ICTF	23	51	109
17 – 18	Meeting Street/Herbert Street to Pittsburgh Avenue	24	52	111

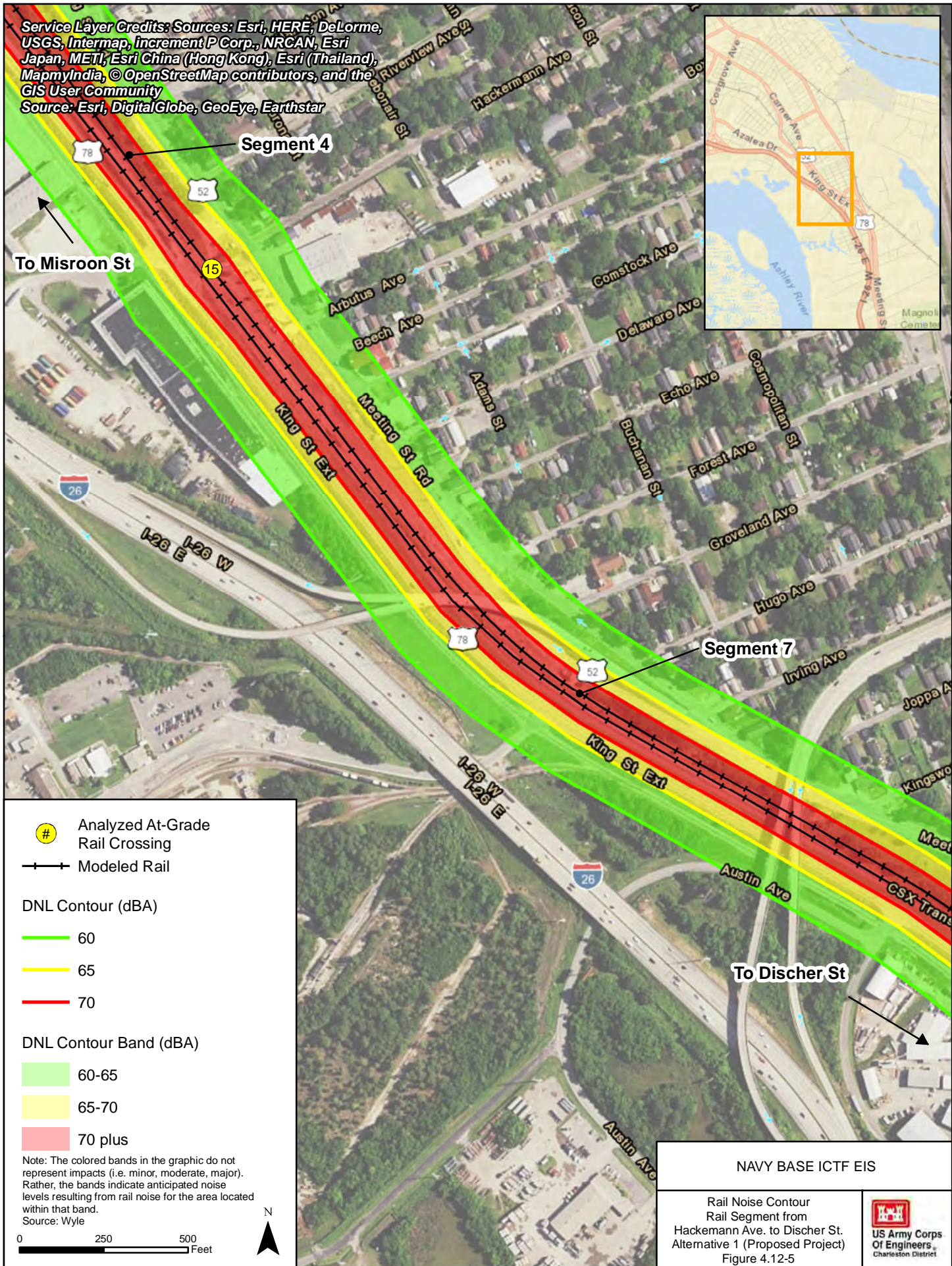
The distances in Table 4.12-9 are compared to those calculated under the No-Action Alternative (refer back to Table 4.12-7) and segments where the noise contours would expand considerably were identified. The noise contours along the rail segments between Dorchester Road to Misroon Street (existing) (Segments 1, 2, and 3), Hackemann Avenue to Discher Street (existing) (Segment 7), and Avenue B and the ICTF facility (proposed) (Segment 5) would expand considerably under Alternative 1 as compared to the No-Action Alternative. Figures 4.12-4, 4.12-5, and 4.12-6 present the calculated DNL noise zones under Alternative 1 for these rail segments, and Table 4.12-10 provides a summary



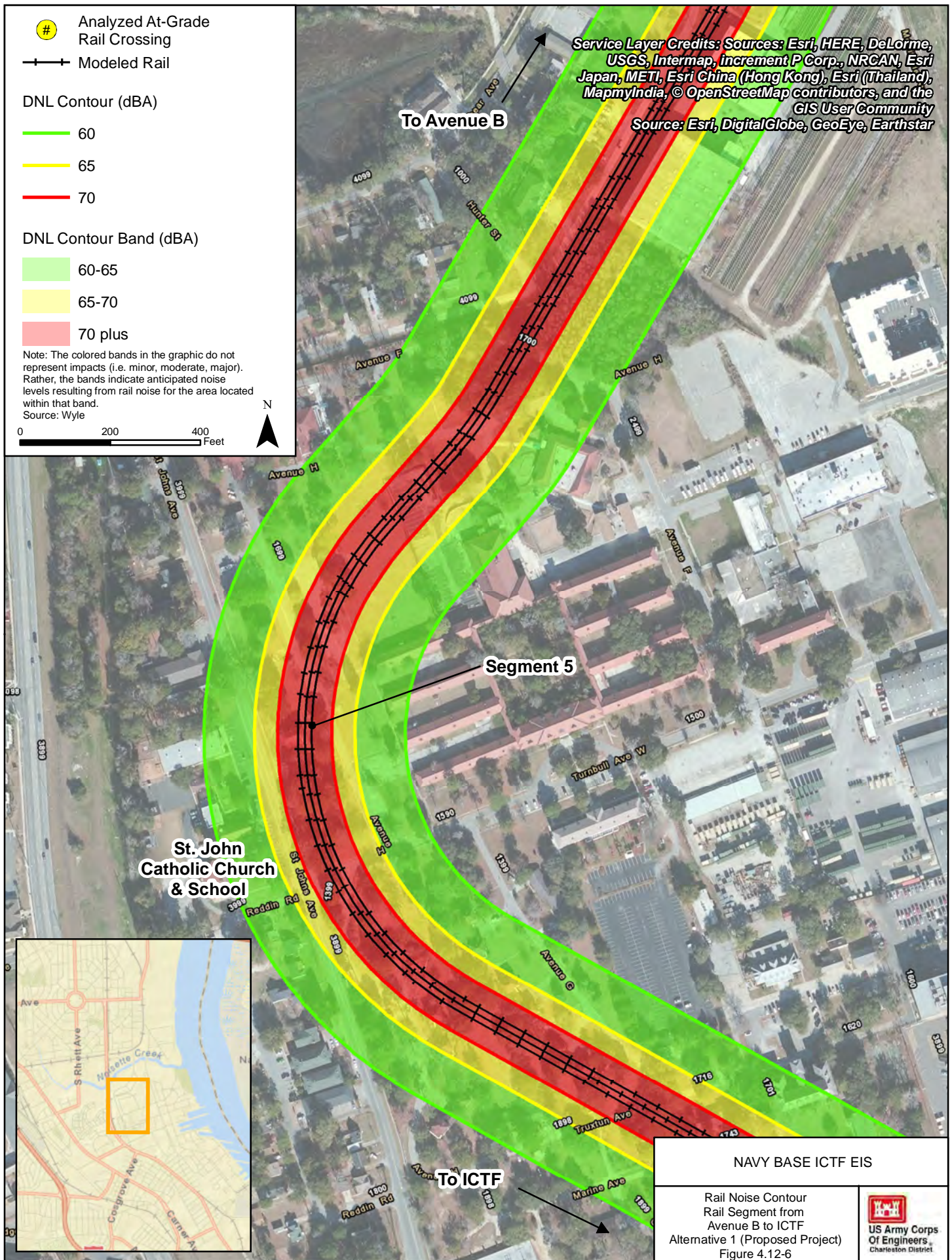
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of the estimated number of impacted receivers along these rail segments. Impact determinations are based on the amount of increase in the decibel level between the No-Action Alternative and Alternative 1. The No-Action Alternative represents the baseline, and no rail noise impacts would occur.

Table 4.12-10  
Estimated Number of Noise Impacted Receptors for Alternative 1 (Proposed Project)

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2 and 3)	25	100	0
Hackemann Avenue to Discher Street (Segment 7)	0	19	0
Avenue B to ICTF (Segment 5)	0	26 <sup>41</sup>	0

The noise contours in Figures 4.12-4, 4.12-5, and 4.12-6 include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.

#### 4.12.3.3 Rail Vibration

As previously noted, potential rail vibration impacts were evaluated for land uses identified along the selected railway segments and included seventy-six receptors. These locations can be found in Appendix H. Based on the evaluation, it was determined that receptors located at a distance less than 20 feet from the track centerline would experience rail vibration impacts. Under Alternative 1, none of the receptors are located at a distance less than 20 feet from the track centerline; therefore, rail vibration effects would be unlikely for the 76 receptors analyzed. The ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative

#### 4.12.3.4 Construction Noise

Assessment of potential scenarios for the construction equipment distribution over the ICTF site during the construction phases noted in Appendix H was conducted using the RCNM model described in sub-section 4.12.1.4. Several scenarios including combinations of seven to fifteen individual pieces of equipment specified in Appendix H (such as excavators, front end loaders, dozers, pile drivers in operation, etc.) were modeled for each construction phase to determine associated additive impacts

<sup>41</sup> Including a school and a church on St. John's Avenue, as shown in Figure 4.12-5. It should be noted that a few of the impacted receptors are located within the limits of construction.

of the combined construction activities. The modeling was conducted for the nearest receptors, where the noise impacts would be the greatest. The representative results of the overall construction noise assessment for Alternative 1 are summarized in Table 4.12-11 for the residential receptors located 10 feet away from the berm's foot at the project site. The predicted construction noise levels are compared with the acceptable impact threshold level of 80 dB(A) following the FTA guidelines (FTA, 2006; Page 12-8) as specified in sub-section 4.12.1.4.

Table 4.12-11  
Predicted ICTF Construction Noise Levels

Construction Phase	$L_{eq}$ , dB(A)	Acceptable Threshold	Noise Impact
Demolition and Surcharge	from 73 to 75	80 dB(A)	No
Earthen Berm Construction	from 85 to 89	80 dB(A)	Moderate
On-Site NBIF Yard – no pile driving	from 75 to 78	80 dB(A)	No
On-Site NBIF Yard – with pile driving	from 82 to 89	80 dB(A)	Minor to Moderate

The average construction noise levels at the nearest residential land uses would meet the established criterion of 80 dB(A) during the general demolition/grading phase and the on-site NBIF yard construction phase. For short periods of time over the earthen berm construction (15 days) and pile driving activities (total of 90 days), the average noise levels are expected to exceed the acceptable criterion of 80 dB(A). Construction activities of the predicted noise levels would be clearly audible over the existing ambient noise in the surrounding communities, but may be tolerable due to the interim nature of the disturbance. The earthen berm construction and pile driving activities would be short-term, but still generate minor to moderate noise impacts with potential adverse community reaction.

Further information regarding specific construction operations and noise sources is available in Appendix H. Additionally, Appendix H contains ideal placements for specific pieces of equipment in terms of distance away from noise sensitive receivers to meet the construction noise threshold.

#### 4.12.3.5 Operational Noise

The primary sources of the ICTF operational noise would be train movements at the classification and processing rail tracks, container loading/unloading operations performed by wide-span gantry cranes, and container stacking at the site. The noise levels generated by these sources are evaluated in Appendix H. The operational noise analysis for Alternative 1 is summarized in Table 4.12-12 for the residential receptors located 10 feet away from the berm's foot at the project site. These receptors would be impacted the most by noise from the ICTF operations. The table presents the main individual operations generating noise at the site. Operations such as truck movements or fork lifting would be concentrated in the area located much farther from the noise-sensitive receptors, beyond the train arrival/departure tracks, classification tracks, crane runways and container stacking area;

noise levels at the residential receptors from these remote operations would be negligible in comparison with the primary noise sources.

Table 4.12-12  
Proposed Project Operational Noise at Nearest Receivers, Alternative 1 (Proposed Project)

Noise Source	Operation	Leq Type	Reference Noise Level (dBA)	Distance Attenuation (dBA)	Noise Berm Attenuation (dBA)	Noise Level at Receiver (dBA)
Train (134 feet from receiver)	Arrival/ Departure	Max 1-sec Leq	81	11	10	60
	Car Coupling		97	11	10	76
	General Car Movement		64	11	10	43
Train (309 feet from receiver)	Arrival/ Departure	Max 1-sec Leq	81	18	10	53
	Car Coupling		97	18	10	69
	General Car Movement		64	18	10	36
Crane (309 feet from receiver)	Crane/Trolley Travelling	Maximum Level	70	12	10	48
	Crane Travelling	Average Level Per Hour	55	12	10	33
Container Impacts (309 feet from receiver)	Container Stacking	Max 1-sec Leq	70	12	10	48

The reference noise levels for train operations in Table 4.12-12 were obtained from measurements taken 38 feet from the track (see Appendix H). To verify compliance with the FRA NEPA noise standard, the reference noise levels were compared with the levels outlined in 49 CFR Part 210, Railroad Noise Emission Compliance Regulations. This guidance prescribes minimum compliance regulations for the total sound emitted by moving individual locomotives and rail cars under certain conditions. At a 100-foot measurement distance, the FRA's maximum allowable level for a moving locomotive is 90 dB(A). For comparison, the reference noise level for a train (locomotive) arrival/departure event of 81 dB(A) as measured at a distance of 38 feet, was converted<sup>42</sup> to a 100-foot distance, where it would be approximately 73 dB(A), which is lower than the FRA's compliance level. Also converted to a 100-foot distance, the rail car movement would have a noise level of 56 dB(A), which is lower than the compliance level of 88 dB(A) for rail cars moving with speeds less than 45 mph. At the same measurement distance, the car coupling operations would have a noise level of 89 dB(A), which is lower than the compliance level of 92 dB(A) for this operation. The above comparisons show that the reference noise levels associated with the train operations at the project site would be lower than the FRA's noise standards for railroad equipment, yards, and facilities.

<sup>42</sup> The conversion is conducted using a term  $20 \log_{10}(\text{distance})$  that signifies the spherical spreading of acoustic energy with a sound level which decreases 6 dB per doubling of distance from the source.



In Table 4.12-12, the reference noise levels of the noise sources are further adjusted to account for the distance attenuation and noise attenuation due to the berm located between the sources at the project site and the nearest noise-sensitive receptors. The appropriate distance attenuation and noise berm attenuation factors are specified in Appendix H.

The hourly average noise level of the train operations is estimated in Appendix H and would be approximately 15 to 20 dB(A) below the maximum level measured for the car coupling. Applying this adjustment factor to the maximum car coupling noise level determined in Table 4.12-12, the hourly average noise level at the nearest receptors from the ICTF train operations is assessed in the range from 49 to 61 dB(A). Since other ICTF operational noise sources would be located farther from the residential receptors and would generate lower noise levels at these receivers than train operations, their additive contribution to the combined noise level of the overall operations at ICTF would be minor in comparison with the train operations at the site. Altogether, the average noise level of the total ICTF operations at the nearest residential receptors would be expected in the range from 58 to 61 dB(A).

Exterior noise impacts from the Proposed Project operations are determined in comparison with the 2038 No-Action Alternative exterior noise levels for the community adjacent to the site (see Table 4.12-4). The impacts for the nearest receptors (10 feet from the berm) are summarized in Table 4.12-13 for daytime and nighttime conditions. Daytime noise impact (7:00 a.m. to 10:00 p.m.) is most important to consider as this can affect people's activities outside their homes. The exterior noise levels from the ICTF operations would exceed the No-Action ambient noise level in the Chicora-Cherokee Communities during daytime hours by up to 7 dB(A). Such an increase constitutes a moderate noise impact for the residential land uses nearest to the project site (as defined in Table 4.12-5). For the second row of homes along the earthen berm, assuming some shielding from the first row of homes, the daytime noise impact from the ICTF operations could be up to 4 dB(A), which is a minor impact. For the third row of homes, a negligible daytime noise impact below 3 dB(A) would likely be produced due to shielding from both the first and second rows of homes. It is anticipated that negligible daytime noise impacts below 3 dB(A) would be generated by the ICTF operations at distances beyond approximately 180 feet from the earthen berm.

Table 4.12-13  
Operational Noise Impact at Nearest Receptors, Alternative 1 (Proposed Project)

Time of Day	Average Operational Noise Level at Receptors, dB(A)	2038 No-Action Ambient Noise Level, dB(A)	Operational Noise Impact
Daytime	from 58 to 61	54	From 4 to 7 dB(A) (Minor to Moderate)
Nighttime	Exterior from 58 to 61 Interior from 38 to 41	44	Exterior from 14 to 17 dB(A) (Major)

With respect to operational noise, ambient noise associated with ICTF operations could expose the adjacent residential areas to exterior noise level increases over the No Action ambient of 4 to 7 dB(A) during daytime hours (defined as 7:00 a.m. to 10:00 p.m.) and 14 to 17 dB(A) during nighttime hours (defined as 10:00 p.m. to 7:00 a.m.). When compared to the No-Action ambient, this would equate to a minor to moderate impact during the daytime hours and a major impact during the nighttime hours to exterior noise levels. However, the nighttime hours are generally associated with sleep. The manner in which older homes were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dB(A) (Caltrans 1998) with closed windows. Taking into account a minimum 20 dB(A) reduction in noise levels from exterior to interior, interior noise levels would range from 38 to 41 dB(A) during the nighttime hours. Based on a study conducted for sleep disturbance as a function of single-event noise exposure, less than 1 percent are awakened at noise levels of 45 dB(A)<sup>43</sup>. Thus, the nighttime interior levels expected as a result of the ICTF operations are expected to be less than the 45 dB(A).

#### **4.12.4      Alternative 2: Proposed Project Site (CSX – South via Milford/ NS – North via S-line)**

Under Alternative 2, the Palmetto Railways Project would be constructed as a variation of the Proposed Project. Alternative 2 differs from the Proposed Project on where the northern rail connection for NS would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the NS northern rail connection alignment. The project site construction and operational activities would remain essentially the same as for Alternative 1.

##### **4.12.4.1      Traffic Noise**

Table 4.12-14 shows the averaged TNM modeled traffic noise levels for Alternative 2 and compares those with the No-Action Alternative noise levels. Specific traffic noise levels for individual receptors are available in Appendix H. Table 4.12-14 shows that under Alternative 2, none of the roadway segments analyzed are expected to experience traffic noise increases exceeding 3 dB(A) in comparison with the 2038 No-Action Alternative. Therefore, Alternative 2 would have a negligible traffic noise impact.

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<sup>43</sup> Finegold and Bartholomew, "A Predictive Model of Noise Induced Awakenings from Transportation Noise Sources," in *Noise Control Engineering Journal*, 2001; pp. 331-338.

Table 4.12-14  
Average 2038 Traffic Noise Levels for Alternative 2  
versus No-Action Alternative

Description	2038 Alternative 2 Loudest-Hour Leq(h), dB(A)	2038 No-Action Loudest-Hour Leq(h), dB(A)	Alt 2 minus No-Action
Virginia Avenue	74	72	2
Spruill Avenue from North Carolina Avenue to Cosgrove Avenue	64	66	-2
Cosgrove Avenue	68	67	1
Spruill Avenue from Cosgrove Avenue to Noisette Creek	65	65	0
St. Johns Avenue	56	57	-1
Noisette Boulevard	55	54	1
North Rhett Avenue	67	67	0
Montague Avenue	55	55	0

#### 4.12.4.2 Rail Noise

Under Alternative 2, the rail operations on the rail segments from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) and from Hackemann Avenue to Discher Street (Segment 7) would increase similar to Alternative 1. The data shown for Alternative 1 in Table 4.12-9 and Figures 4.12-4 and 4.12-5 are applicable (within several feet) to the DNL contours and noise zones for Alternative 2 for these rail segments.

Figures 4.12-7 and 4.12-8 show new build rail segments from O'Hear Avenue to the ICTF facility in the vicinity and south of crossing 19 (Segment 6). These stretches of track would only be built under Alternative 2, and noise from trains would impact eight residences along the first segment and 10 residences along the southern continuation of the rail line parallel to Spruill Avenue. Impacts along these rail segments would be moderate to major. It should be noted that land uses in closer proximity to the track path may need to be demolished in order to construct the track.







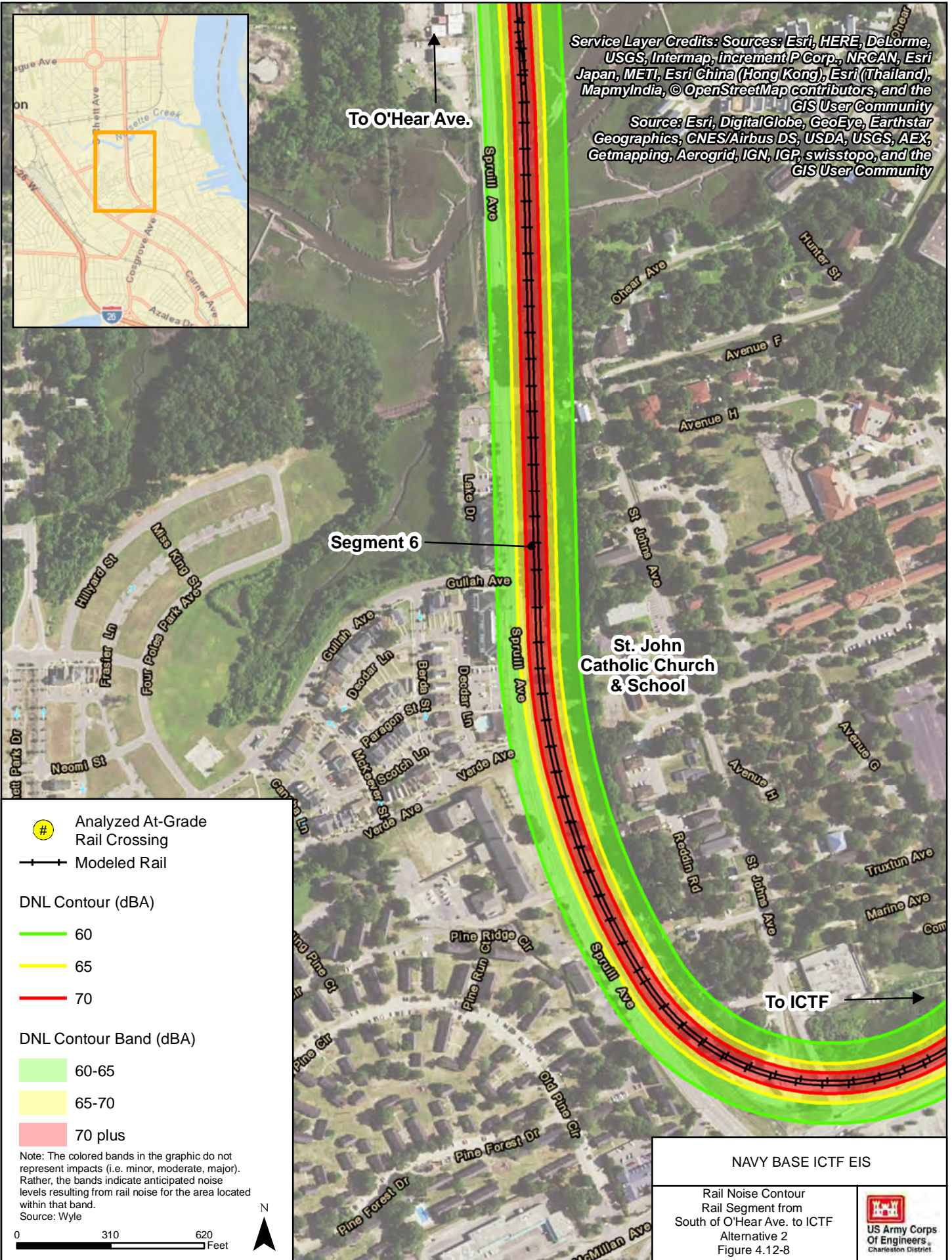


Table 4.12-15 provides a summary of the estimated number of impacted receivers along the rail segments discussed above.

Table 4.12-15  
Estimated Number of Noise Impacted Receptors for Alternative 2

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2 and 3)	25	100	0
Hackemann Avenue to Discher Street (Segment 7)	0	19	0
O'Hear Avenue to ICTF (Segment 6)	0	14	4

The noise contours include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.

#### 4.12.4.3 Rail Vibration

Under Alternative 2, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

A separate special case was considered for a bank building located at 1900 McMillan Avenue to address concerns related to potential false triggering of the bank security alarm by the train operations at the Spruill Avenue track segment. The closest wall of the building would be located at a distance of 250 feet from the rail track. Ground-borne vibration level at this one-story masonry building is estimated at 56 VdB. The vibration impact criterion for buildings with moderately sensitive equipment is 65 VdB (FTA 2006). The train vibration at the bank under normal conditions would be below this criterion and, false alarm triggering would not be expected.

#### 4.12.4.4 Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 2 are identical to the ones estimated under Alternative 1 (Proposed Project).



#### 4.12.4.5 Operational Noise

Noise impacts from the project site operations under Alternative 2 are identical to the ones estimated for Alternative 1 (Proposed Project).

#### 4.12.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

Under Alternative 3, the Palmetto Railways Project would be constructed as a variation of the Proposed Project. Alternative 3 differs from the Proposed Project on where the southern rail connection for CSX would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the CSX southern rail connection alignments. Alternative 3 includes a new at-grade crossing at Spruill Avenue and Meeting Street. The project site construction and operational activities would remain essentially the same as for Alternative 1 (Proposed Project).

##### 4.12.5.1 Traffic Noise

Under Alternative 3, the ICTF would be located and would operate the same as described under Alternative 1 (Proposed Project), and the road improvements and traffic volumes on the roads in the vicinity would also be identical. Therefore, the TNM modeling results for traffic noise levels shown in Table 4.12-8 apply to Alternative 3. Alternative 3 would have a negligible traffic noise impact on noise-sensitive land uses.

##### 4.12.5.2 Rail Noise

Under Alternative 3, the rail operations would increase similar to Alternative 1. Table 4.12-9 and Figure 4.12-4 provided for the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) under Alternative 1 are applicable (within several feet) to the DNL contours and noise zones under Alternative 3. Slightly smaller noise zones were determined for the rail segment from Hackemann Avenue to Discher Street (Segment 7) under Alternative 3 when compared to Alternatives 1 and 2.

Figure 4.12-9 shows a new build rail segment from Meeting Street to Spruill Avenue in the vicinity of crossing 20 (Segment 8). This stretch of track would only be built under Alternatives 3 and 6, and noise from trains would impact 10 noise sensitive receivers along the segment. The noise impact for these receivers would be minor to moderate. Land uses in closer proximity to the track path may be demolished in the construction of the rail track for this alternative.

Under Alternative 3, the proposed rail configuration between Avenue B and the ICTF facility (Segment 5) is identical to the Alternative 1 alignment and would impact the same receivers including a school and a church. A moderate noise impact is estimated for these land uses.

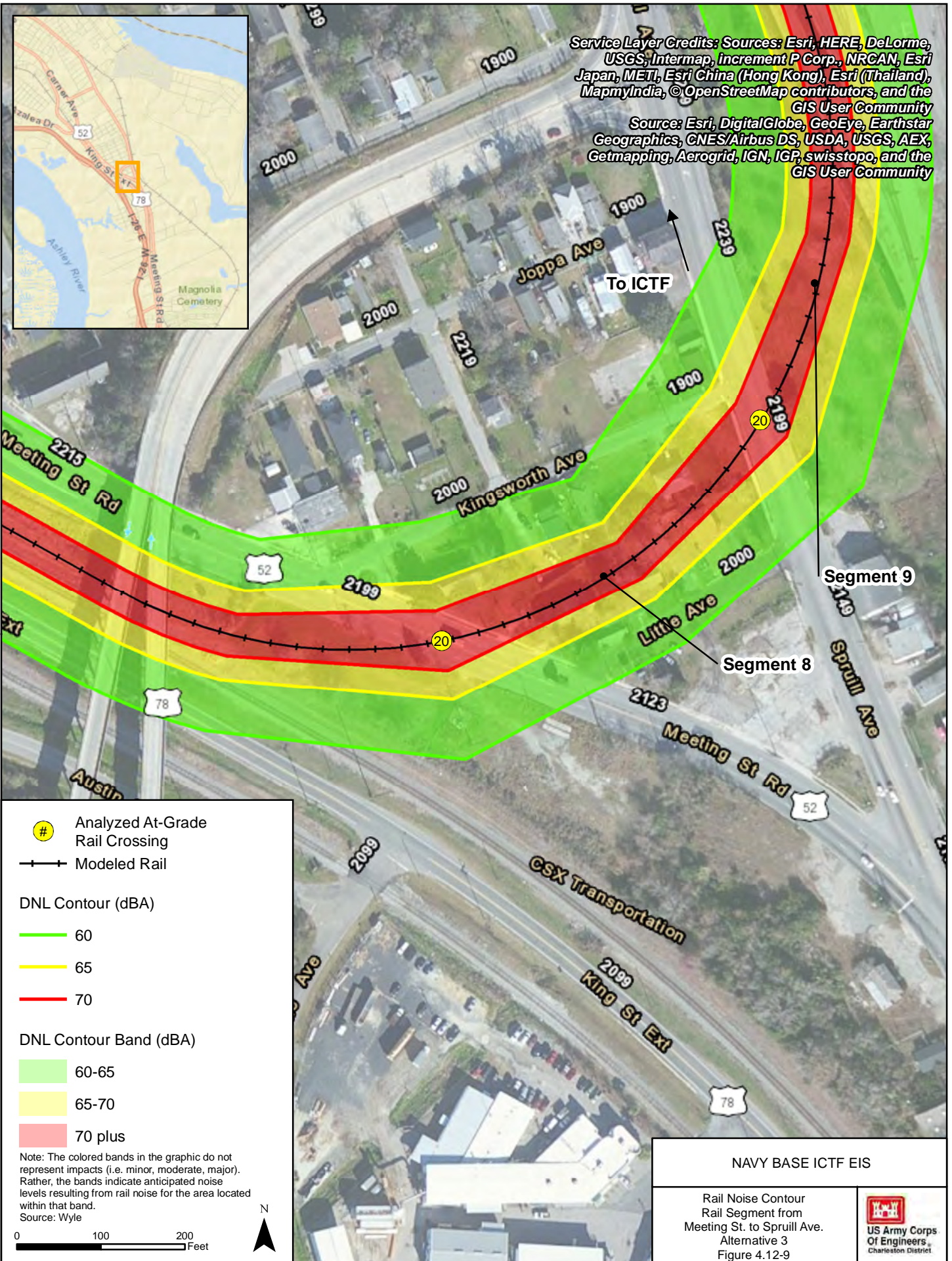




Table 4.12-16 provides a summary of the estimated number of impacted receivers along the rail segments discussed above. The noise contours shown include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.

Table 4.12-16  
Estimated Number of Noise Impacted Receptors for Alternative 3

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2 and 3)	25	100	0
Hackemann Avenue to Discher Street (Segment 7)	0	16	0
Meeting Street to Spruill Avenue (Segment 8)	3	7	0
Avenue B to ICTF (Segment 5)	0	26	0

#### 4.12.5.3 Rail Vibration

Under Alternative 3, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

#### 4.12.5.4 Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 3 are identical to the ones evaluated under Alternative 1.

#### 4.12.5.5 Operational Noise

Noise impacts from site operations under Alternative 3 are identical to the ones estimated under Alternative 1.

### 4.12.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

Alternative 4 would be constructed as a variation of the Proposed Project where NS and CSX enter and exit the Navy Base ICTF from a southern rail connection. NS would connect to an existing NS rail line. A tail track would extend through the Hospital District and stop short of Noisette Creek. Road improvements would be the same as those identified in Alternative 2. The project site construction and operational activities would also remain essentially the same as for Alternative 2.



#### 4.12.6.1 Traffic Noise

Under Alternative 4, the ICTF would be located and would operate the same as described in Alternative 2, and the road improvements and traffic volumes would also be identical. Therefore, the traffic noise levels shown in Table 4.12-14 for Alternative 2 apply to Alternative 4. Alternative 4 would have a negligible traffic noise impact on noise-sensitive land.

#### 4.12.6.2 Rail Noise

Under Alternative 4, the noise contours along the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) shown in Figure 4.12-10 would be significantly expanded in comparison to the No-Action Alternative. The number of residences located within the 70, 65, and 60 dB(A) noise zones would increase.

For the existing track from Hackemann Avenue to Discher Street (Segment 7), Figure 4.12-11 displays the DNL zones generated by the Alternative 4 rail operations between locations 15 and 16. Under Alternative 4, the noise zones would expand considerably in comparison to the No Build Alternative.

Alternative 4 would result in a minor to moderate rail noise impacts for the studies rail above rail segments on surrounding noise-sensitive land uses. Table 4.12-17 provides a summary of the estimated number of impacted receivers along the rail segments discussed above.

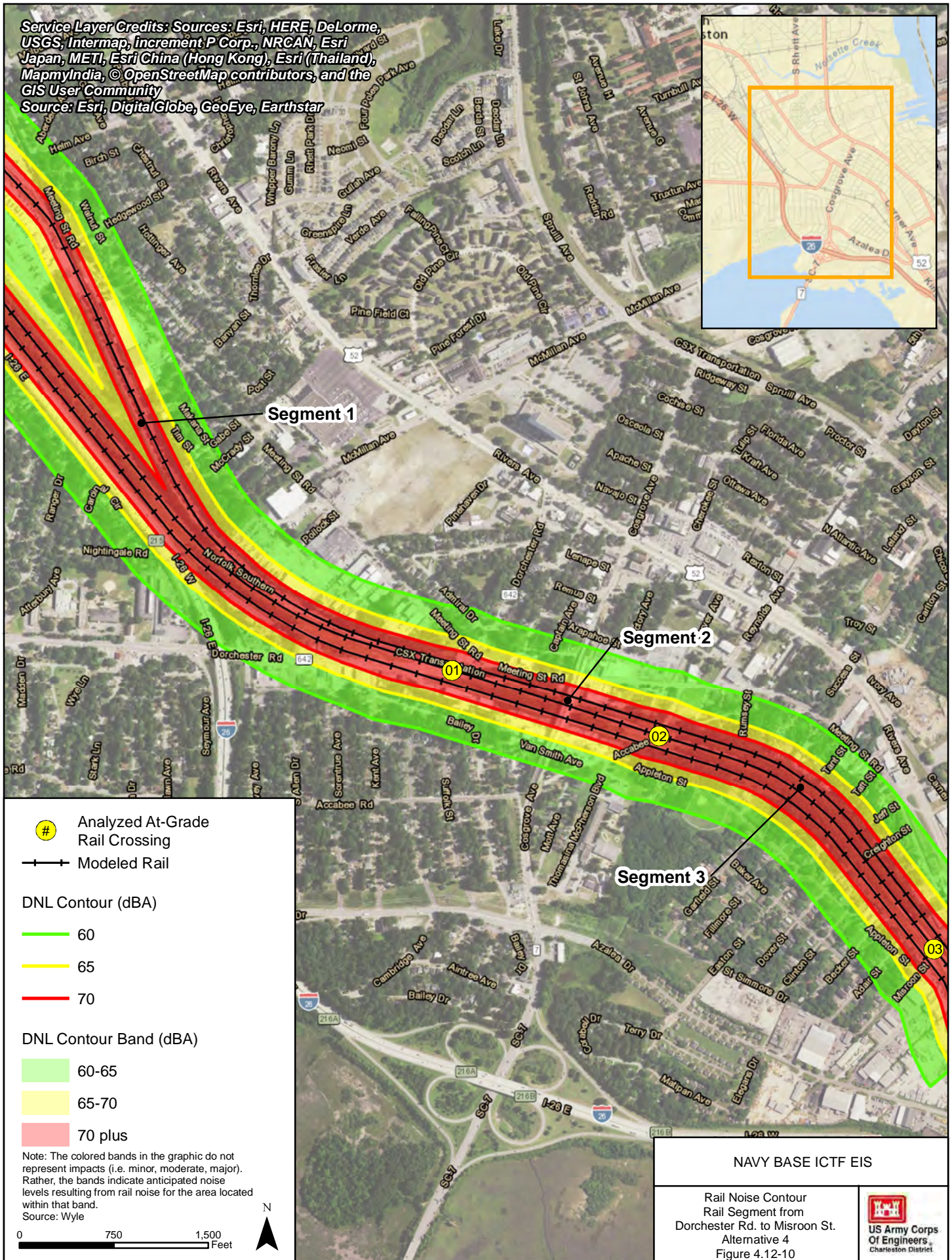
Table 4.12-17  
Estimated Number of Noise Impacted Receptors for Alternative 4

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2, and 3)	60	170	0
Hackemann Avenue to Discher Street (Segment 7)	10	39	0

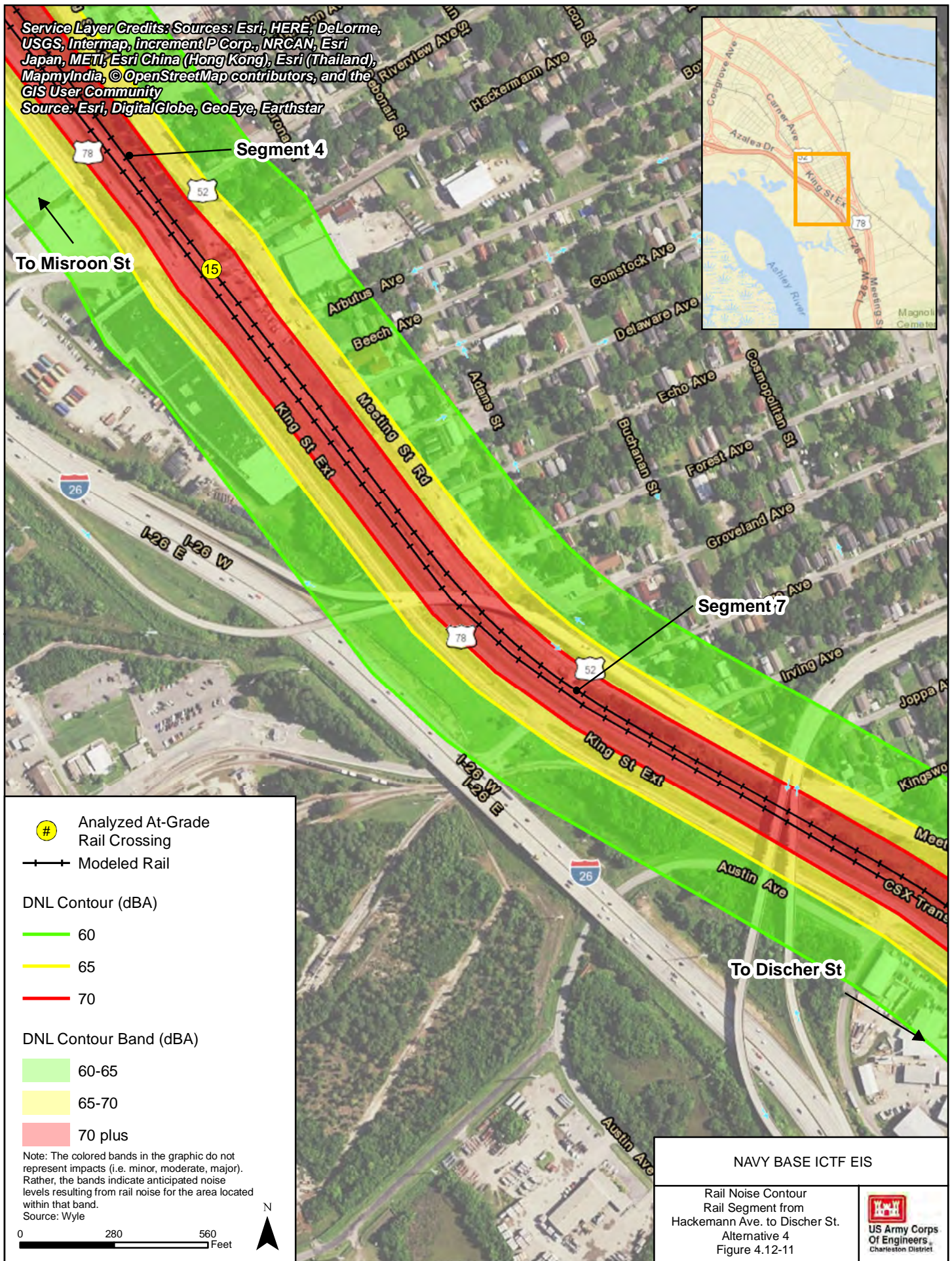
The noise contours include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.



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Source: Esri, DigitalGlobe, GeoEye, Earthstar









#### 4.12.6.3 Rail Vibration

Under Alternative 4, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

#### 4.12.6.4 Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 4 are identical to the ones evaluated under Alternative 1.

#### 4.12.6.5 Operational Noise

Noise impacts from the project site operations under Alternative 4 are identical to the ones estimated under Alternative 1 (Proposed Project).

### 4.12.7 Alternative 5: River Center Site (CSX – South via Milford / NS – North via Hospital Drive)

Alternative 5 is a variation of the Proposed Project with the project site being moved to the River Center project site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. Roadway improvements for this alternative would incorporate a new segment of Port drayage road through the Proposed Project's site and other road modifications. Operation activities associated with the ICTF at the River Center project site would be similar to the Proposed Project; however, different communities would potentially experience associated noise impact for adjacent sensitive land uses. A sound attenuation and security wall would be constructed adjacent to Noisette Boulevard along the length of the eastern boundary of the facility site.

#### 4.12.7.1 Traffic Noise

Table 4.12-18 shows the averaged TNM modeled traffic noise levels for the receptors identified in Appendix H for Alternative 5 and compares those with the No-Action noise levels. Specific traffic noise levels for individual receptors can be found in Appendix H.

Table 4.12-18  
Averaged 2038 Traffic Noise Levels for Alternative 5 versus No-Action Alternative

Description	2038 Alternatives 5 Loudest-Hour Leq(h), dB(A)	2038 No-Action Loudest-Hour Leq(h), dB(A)	Alternatives 5 minus No-Action
Virginia Avenue	74	72	2
Spruill Avenue from North Carolina Avenue to Cosgrove Avenue	67	66	1

Description	2038 Alternatives 5 Loudest-Hour Leq(h), dB(A)	2038 No-Action Loudest-Hour Leq(h), dB(A)	Alternatives 5 minus No-Action
Cosgrove Avenue	68	67	1
Spruill Avenue from Cosgrove Avenue to Noisette Creek	66	65	1
St. Johns Avenue	59	57	2
Noisette Boulevard	55	54	1
North Rhett Avenue	67	67	0
Port drayage road	59	53	6
Montague Avenue	56	55	1

As shown in Table 4.12-18, the change between the loudest-hour Leq(h) for Alternative 5 and the 2038 No-Action Alternative would not exceed 3 dB(A) for any receptor, with the exception of 18 receptors exposed to the proposed Port drayage road. For these 18 residential land uses in the Chicora-Cherokee community, the Alternative 5 noise levels would exceed the No-Action Alternative levels by 4 to 7 dB(A), which indicates a minor to moderate traffic noise impact. For all the other noise-sensitive land uses, negligible traffic noise impacts are anticipated under Alternative 5.

#### 4.12.7.2 Rail Noise

Under Alternative 5, operations on the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) would increase in comparison to the No-Action Alternative, similar to Alternative 1 (Proposed Project). The data presented for Alternative 1 (Proposed Project) for this rail segment are applicable (within several feet) to the DNL contours and noise zones under Alternative 5. The same conclusion applies to the rail segment from Hackemann Avenue to Discher Street (Segment 7).

Figure 4.12-12 shows a new build rail segment from Pittsburg Avenue to the ICTF facility (Segment 10), north of crossing 17. Under Alternative 5, the ICTF facility would be located at the River Center project site. Along this stretch of track, 23 noise sensitive receivers within the Chicora-Cherokee communities would be impacted by rail activity, as shown in Figure 4.12-12. Most of the affected residential land uses would be located within the DNL zone from 60 to 65 dB(A). They would be exposed to moderate noise impacts [from 5 to 10 dB(A) in comparison with the 2038 No-Action Alternative.



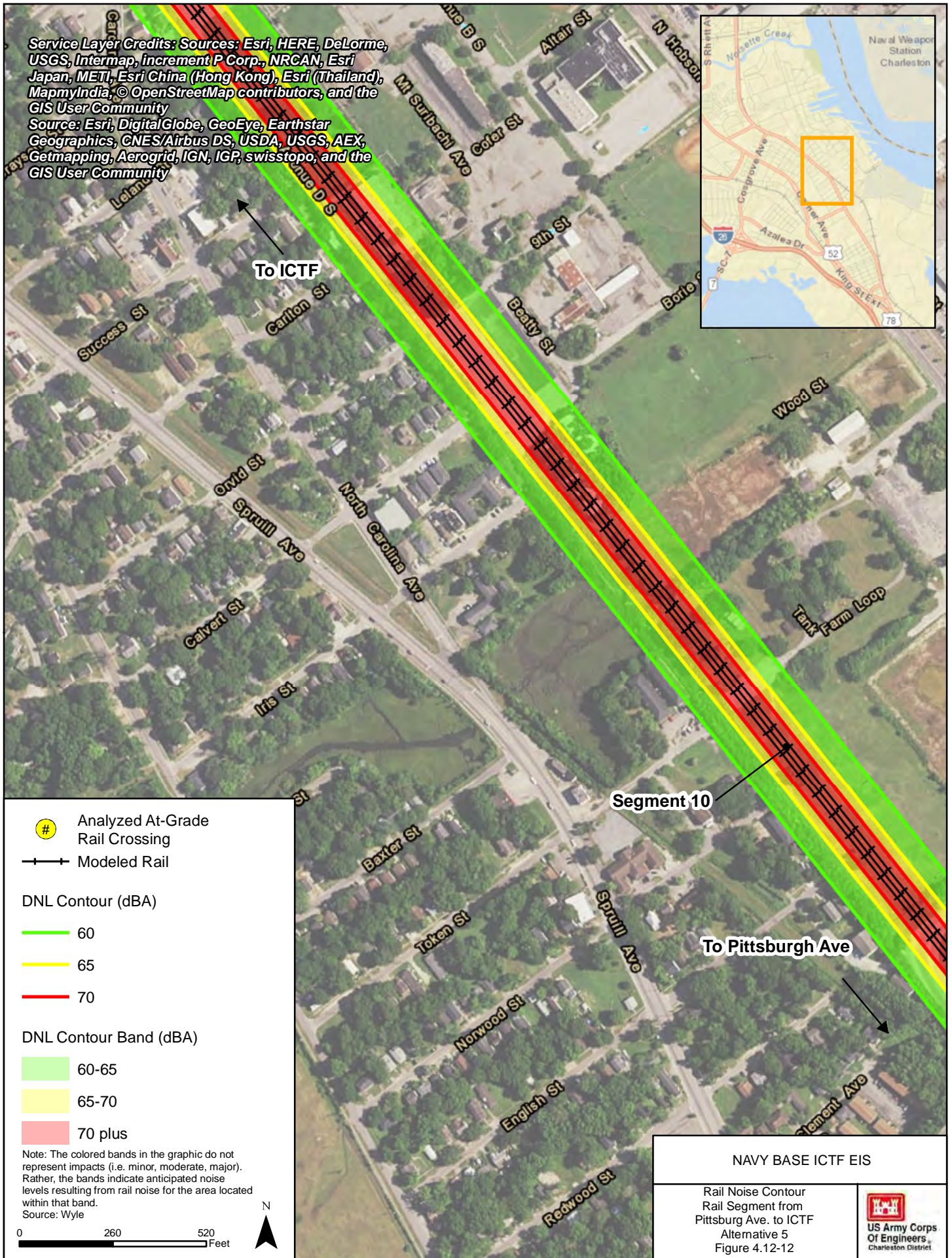




Table 4.12-19 provides a summary of the estimated number of impacted receivers along the rail segments discussed above.

Table 4.12-19  
Estimated Number of Noise Impacted Receptors for Alternative 5

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2 and 3)	25	100	0
Hackemann Avenue to Discher Street (Segment 7)	0	19	0
Pittsburg Avenue to ICTF (Segment 10)	0	23	0

The noise contours include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.

#### 4.12.7.3 Rail Vibration

Under Alternative 5, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

#### 4.12.7.4 Construction Noise

The ICTF construction at the River Center project site would be accomplished similarly to construction at the project site in Alternative 1 (Proposed Project). Similar construction phases, time schedules, and equipment would be utilized; however, due to differing site layout, different communities would be exposed to construction noise. The earthen berm would not be constructed; however, a 16-foot sound attenuation and security wall would be constructed adjacent to Noisette Boulevard along the length of the eastern boundary of the River Center project site for abatement of noise from ICTF operations.

Analysis of the noise conditions related to construction activities under Alternative 1 (Proposed Project) is valid for the River Center project site under Alternative 5 (see Table 4.12-11). Construction of the sound attenuation wall would occur in proximity to the residential community of CNYOQ Historic District. Impact pile drivers would be utilized in various locations at the site in construction of the noise wall, support pads for rail mounted gantry cranes, and for driving H-beam piles for box culvert upgrades. The average construction noise levels at the nearest residential land

uses would meet the established criterion of 80 dB(A) during the general demolition/grading phase and the on-site NBIF yard construction phase. For short periods of time over the noise wall construction and other pile driving activities, the average noise levels are expected to exceed the accepted criterion. Construction activities would be clearly audible over the existing ambient noise in the community, but may be tolerable due to the interim nature of the disturbance. The pile driving activities would be short-term.

#### 4.12.7.5 Operational Noise

Operational noise analysis for the River Center project site is similar to the one provided for Alternative 1 (Proposed Project). Operation activities would be identical, the primary sources of operational noise would be the same, and the site layout would also be similar but with the reversed north-south general orientation. No earthen berm would be constructed, but a sound attenuation and security wall would be built as noted above. The nearest noise-sensitive receivers would be located in the CNYOQ Historic District along Manley Avenue (east of Noisette Boulevard), at a distance of 150 feet from the ICTF train operations. Table 4.12-20 summarizes the operational noise analysis for the River Center project site for these receptors that would be impacted the most by noise from the ICTF operations. The table presents the main individual operations generating noise at the site (train, crane, and containers). Operations such as truck movements or fork lifting would be concentrated in the area located much farther from the noise-sensitive receptors, beyond the train arrival/departure tracks, classification tracks, crane runways and container stacking area; noise levels at the residential receptors from these remote operations would be negligible in comparison with the primary noise sources.

Table 4.12-20  
Operational Noise at Nearest Receptors, Alternative 5

Noise Source	Operation	Leq Type	Reference Noise Level (dBA)	Distance Attenuation (dBA)	Noise Berm Attenuation (dBA)	Noise Level at Receiver (dBA)
Train (150 feet from receiver)	Arrival/ Departure	Max 1-sec Leq	81	11	10	60
	Car Coupling		97	11	10	76
	General Car Movement		64	11	10	43
Train (382 feet from receiver)	Arrival/ Departure	Max 1-sec Leq	81	20	10	51
	Car Coupling		97	20	10	67
	General Car Movement		64	20	10	34
Crane (382 feet from receiver)	Crane/Trolley Travelling	Maximum Level	70	13	10	47
	Crane Travelling	Average Level Per Hour	55	13	10	32
Container Impacts (309 feet from receiver)	Container Stacking	Max 1-sec Leq	70	12	10	48

The reference noise levels for train operations in Table 4.12-20 are the same as for the Proposed Project (see Table 4.12-12) and comply with the FRA NEPA noise standards discussed in section 4.12.3.5. The reference noise levels associated with the train operations at the River Center project site would be lower than the FRA's noise standards for railroad equipment, yards, and facilities.

In Table 4.12-20, the reference noise levels of the noise sources are further adjusted to account for the distance attenuation and noise attenuation due to the sound wall located between the sources at the River Center project site and the nearest noise-sensitive receptors. These adjustment factors were determined also similar to the ones for the Proposed Project (refer back to Section 4.12.3.5). The resulting total average noise levels from the ICTF operations at the nearest receptors would be expected in the range from 58 to 61 dB(A), similar to the Proposed Project site.

Noise impacts from the River Center operations are based on exterior levels and determined in comparison with the 2038 No-Action Alternative noise levels for the community adjacent to the site (see Table 4.12-4). The impacts for the nearest receptors are summarized in Table 4.12-21 for daytime and nighttime conditions. Daytime noise impact (7:00 a.m. to 10:00 p.m.) is most important to consider as this can affect people's activities outside their homes. The exterior noise levels from the ICTF operations would exceed the daytime No-Action ambient noise level at the edge of the CNYOQ Historic District during daytime hours by up to 2 dB(A), which is a negligible impact (as defined in Table 4.12-5). Loud operations like rail car coupling would be audible at the nearest residences but, in general, operational noise levels would remain comparable to the ambient noise. Homes east of Manley Avenue and beyond are also expected to experience negligible or no noise impact from daytime ICTF operations due to increased distance and shielding effect from other homes.

Table 4.12-21  
Operational Noise at Nearest Receivers, Alternative 5

Time of Day	Average Operational Noise Level at Receptors, dB(A)	2038 No-Action Ambient Noise Level, dB(A)	Operational Noise Impact
Daytime	from 58 to 61	59	From 0 to 2 dB(A) (Negligible)
Nighttime	Exterior from 58 to 61 Interior from 38 to 41	49	Exterior from 9 to 12 dB(A) (Moderate to major)

With respect to operational noise, ambient noise associated with ICTF operations could expose the adjacent residential areas to exterior noise level increases over the No Action ambient of 0 to 2 dB(A) during daytime hours (defined as 7:00 a.m. to 10:00 p.m.) and 9 to 12 dB(A) during nighttime hours



(defined as 10:00 p.m. to 7:00 a.m.). When compared to the No Action ambient, this would equate to a negligible impact during the daytime hours and a moderate to major impact during the nighttime hours to exterior noise levels. However, the nighttime hours are generally associated with sleep. The manner in which older homes were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dB(A) (Caltrans 1998) with closed windows. Taking into account a minimum 20 dB(A) reduction in noise levels from exterior to interior, interior noise levels would range from 38 to 41 dB(A) during the nighttime hours. Based on a study conducted for sleep disturbance as a function of single-event noise exposure, less than 1 percent are awakened at noise levels of 45 dB(A)<sup>44</sup>. Thus, the nighttime interior levels expected as a result of the ICTF operations are expected to be less than the 45 dB(A).

In general, noise impacts generated by the River Center project site operations are lower in comparison with the impacts produced by the Proposed Project operations due to higher No-Action ambient noise levels anticipated in the vicinity of the River Center project site.

#### **4.12.8      Alternative 6: River Center Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Under Alternative 6, the ICTF would be located at the River Center project site. Road improvements for this alternative would be the same as described in Alternative 5. Rail improvements would be similar to those described for the northern rail connection and the CSX southern rail connection in Alternative 5, except that the southern rail connection for CSX would connect to an existing CSX rail line near Kingworth Avenue. This would result in a new at-grade crossing at Spruill Avenue and Meeting Street. The River Center project site construction and operational activities would remain essentially the same as for Alternative 5.

##### **4.12.8.1      Traffic Noise**

Under Alternative 6, the road improvements and traffic volumes would be identical to the ones under Alternative 5. Therefore, Alternative 6 would generate equal noise levels and TNM modeling results for traffic noise levels shown in Table 4.12-18 apply to Alternative 6. Alternative 6 would have a minor to moderate traffic noise impact for the 18 residential land uses in the Chicora-Cherokee community. For all the other noise-sensitive land uses, no or negligible traffic noise impacts are anticipated under Alternative 6.

##### **4.12.8.2      Rail Noise**

Under Alternative 6, operations on the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2, and 3) would increase similar to Alternative 5. Slightly smaller noise zones with lower

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<sup>44</sup> Finegold and Bartholomew, "A Predictive Model of Noise Induced Awakenings from Transportation Noise Sources," in *Noise Control Engineering Journal*, 2001; pp. 331-338.

counts of impacted residences are determined for the rail segment from Hackemann Avenue to Discher Street (Segment 7) under Alternative 6 as compared to Alternative 5.

Figure 4.12-9 shows a proposed rail segment from Meeting Street to Spruill Avenue in the vicinity of crossing 20 (Segment 8). This stretch of track would only be built under Alternatives 3 and 6, and noise from trains would impact 10 noise sensitive receivers along the segment. Land uses in closer proximity to the track path may be demolished for construction of the proposed rail track.

Under Alternative 6, the proposed new rail segment between Spruill Avenue and the ICTF facility (Segment 9) would impact 23 noise sensitive receivers in the Chicora-Cherokee communities as shown in Figure 4.12-12<sup>45</sup>. A moderate noise impact is estimated for these land uses in comparison with the 2038 No-Action Alternative.

Table 4.12-22 provides a summary of the estimated number of impacted receivers along the rail segments discussed above.

Table 4.12-22  
Estimated Number of Noise Impacted Receptors for Alternative 6

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2, and 3)	25	100	0
Hackemann Avenue to Discher Street (Segment 7)	0	16	0
Meeting Street to Spruill Avenue (Segment 8)	3	7	0
Pittsburg Avenue to ICTF (Segment 9)	0	23	0

The noise contours include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.

#### 4.12.8.3 Rail Vibration

Under Alternative 6, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

<sup>45</sup> Segments 9 and 10 are similar in the vicinity of the Chicora-Cherokee communities, hence the use of the same figure, and differ southeast of the displayed area.

#### 4.12.8.4 Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 6 are identical to the ones evaluated under Alternative 5.

#### 4.12.8.5 Operational Noise

Noise impact from the River Center project site operations under Alternative 6 is identical to those estimated for Alternative 5.

### 4.12.9 Alternative 7: River Center Site (CSX & NS – South via Milford)

Under Alternative 7, the ICTF would be located at the River Center project site. Roadway improvements and traffic projections would be the same as described in Alternative 5. Rail improvements for Alternative 7 would be similar to those described under Alternative 5 with the exception that NS would enter and exit the ICTF from a southern rail connection, as would CSX. The River Center project site construction and operational activities would remain essentially the same as for Alternative 5.

#### 4.12.9.1 Traffic Noise

The TNM modeling results for traffic noise levels shown in Table 4.12-18 apply to Alternative 7, and the analysis conclusions provided for Alternative 5 are valid for Alternative 7. Alternative 7 would have a minor to moderate traffic noise impact for the 18 residential land uses in the Chicora-Cherokee community. For all the other noise-sensitive land uses, no or negligible traffic noise impacts are anticipated under Alternative 7.

#### 4.12.9.2 Rail Noise

Expansion of the noise contours under Alternative 7 is similar to Alternative 4 for the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) (see Figure 4.12-10) when compared to the No-Action Alternative. A similar conclusion applies to the rail segment from Hackemann Avenue to Discher Street (Segment 7), shown in Figure 4.12-11. Under Alternative 7, the DNL zones would also expand considerably versus the 2038 No-Action Alternative.

Figure 4.12-13 shows a new build rail segment from Pittsburg Avenue to the ICTF facility at the River Center project site (Segment 10). This stretch of track would only be built for the southern alignment under Alternatives 5, 6, and 7. Under Alternative 7, however, the DNL zones extend much farther from the track than for the other two alternatives. A moderate noise impact is estimated for most of these land uses in comparison with the 2038 No-Action Alternative.



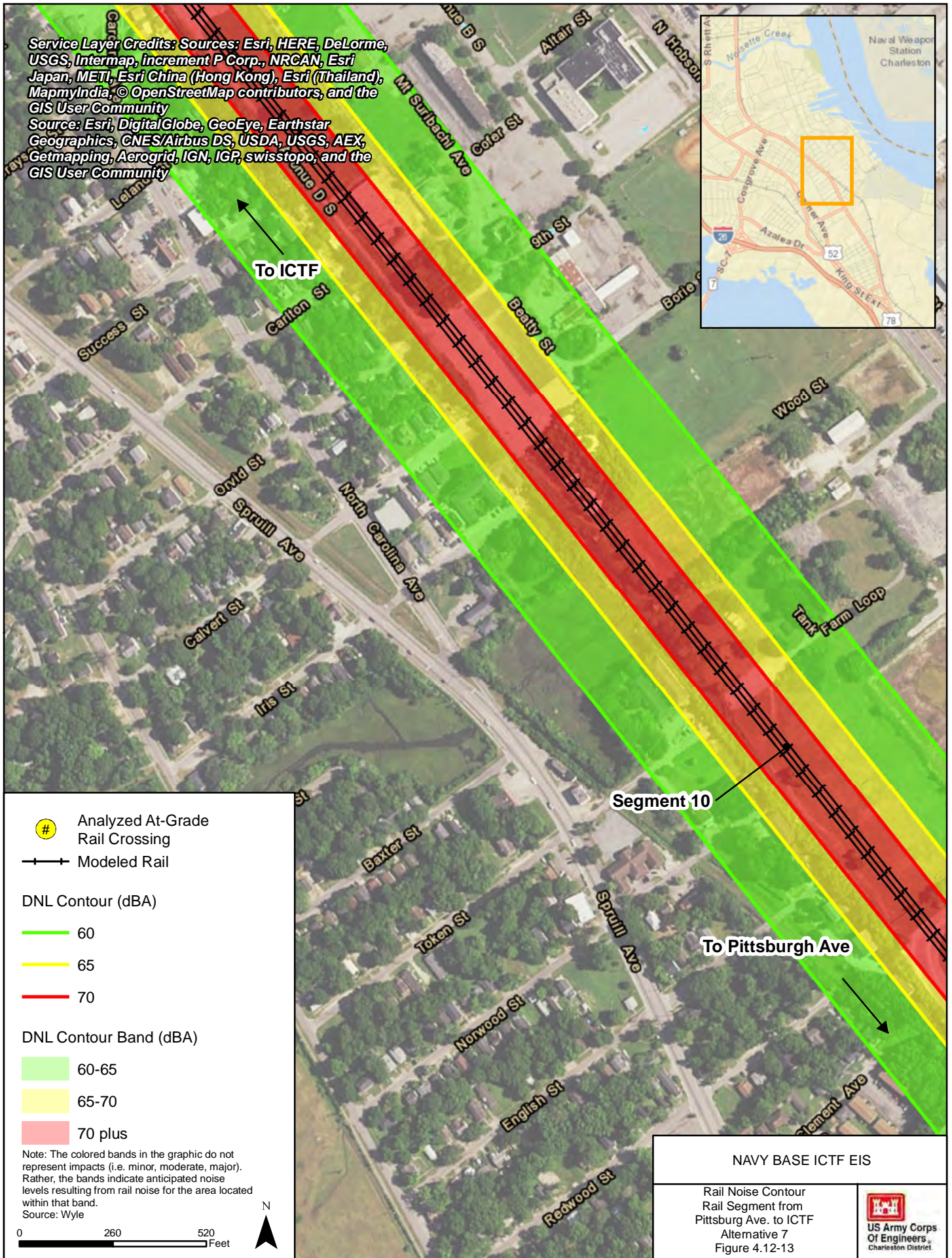


Table 4.12-23 provides a summary of the estimated number of impacted receivers along the rail segments discussed above.

Table 4.12-23  
Estimated Number of Noise Impacted Receptors for Alternative 7

Rail Segment	Estimated Number of Impacted Receptors		
	Minor Impact	Moderate Impact	Major Impact
North of Dorchester Road to Misroon Street (Segments 1, 2, and 3)	60	170	0
Hackemann Avenue to Discher Street (Segment 7)	10	39	0
Pittsburg Avenue to ICTF (Segment 10)	10	59	0

The noise contours include horn noise effects. At rail crossings, the contour expands in size due to train horn soundings. Further details on the specific dimensions and distances of the noise contours at crossing locations can be found in Appendix H.

#### 4.12.9.3 Rail Vibration

Under Alternative 7, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

#### 4.12.9.4 Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 7 are identical to the ones evaluated for Alternative 5.

#### 4.12.9.5 Operational Noise

Noise impacts from the River Center project site operations under Alternative 7 are identical to those estimated for Alternative 5.

#### 4.12.10 Summary of Impacts Table

The noise impact analyses are summarized above for the No-Action Alternative and Alternatives 1 through 7, and in Appendix H. The receptors analyzed are presented in Figures 4.12-1 and Appendix H. The rail segments analyzed are shown in Figure 4.12-2, with the related rail noise contours provided in Figures 4.12-3 through 4.12-12.



Table 4.12-24 summarizes the impacts due to traffic noise, rail noise, rail vibration, facility construction, and facility operation for all potential build alternatives as compared to the No-Action Alternative. The numbers in parentheses for the traffic and rail noise impacts indicate the exterior impact values in comparison with the exterior noise levels for the No-Action Alternative. For the rail vibration impacts, the numbers in parenthesis indicate comparison with the impact criterion of 80 VdB. Construction noise impacts are shown in comparison with the impact threshold value of 80 dB(A) (see subsection 4.12.1.4). Operational noise impacts are shown in comparison with the exterior No-Action daytime and nighttime ambient noise levels for the related residential community indicated in Table 4.12-4.

Table 4.12-24  
Summary of Impacts, Noise and Vibration

Alternative	Traffic Noise Impacts	Rail Noise Impacts	Rail Vibration Impacts	Construction Noise Impacts	Operational Noise Impacts
No-Action	–	–	–	–	–
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Negligible impact [0 to 2 dB(A)]. Negligible beneficial effect for several streets.	Minor to Moderate impact [(3 to 10 dB(A)) along several segments due to increased rail activity and new track builds.	Negligible impact (below 80 VdB)	Minor to Moderate impact [3 to 9 dB(A)] in the vicinity of noise berm due to frequent operations of construction equipment.	Minor to Moderate exterior daytime impact [4 to 7 dB(A)] and major exterior nighttime impact [14 to 17 dB(A)]*.
<b>2: CSX – Milford / NS – S-line</b>	Negligible impact [0 to 2 dB(A)]. Minor beneficial effect for several streets.	Minor to Moderate impact [(3 to 10 dB(A)) along several segments due to increased rail activity and new track builds. Major impact [above 10 dB(A)] for up to 4 land uses along one future track segment.	Negligible impact (below 80 VdB)	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).
<b>3: CSX – Kingsworth / NS – Hospital</b>	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).
<b>4: CSX &amp; NS – Milford</b>	Negligible impact [0 to 2 dB(A)]. Minor beneficial effect for several streets.	Minor to Moderate impact [(3 to 10 dB(A)) along several segments due to increased rail activity in the southern alignment.	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).	Similar to the Proposed Project (Alternative 1).



Alternative	Traffic Noise Impacts	Rail Noise Impacts	Rail Vibration Impacts	Construction Noise Impacts	Operational Noise Impacts
<b>5: River Center</b> <b>Project Site:</b> <b>CSX –</b> <b>Milford /</b> <b>NS – North</b> <b>via Hospital</b> <b>District</b>	Negligible impact [0 to 2 dB(A)]. Minor to Moderate impact [4 to 7 dB(A)] along one future road.	Minor to Moderate impact [(3 to 10 dB(A)] along several segments due to increased rail activity and new track builds. Moderate impact [(5 to 10 dB(A)] along one new build future segment.	Negligible impact (below 80 VdB).	Minor to Moderate impact [3 to 10 dB(A)] in the vicinity due to frequent operations of construction equipment.	Negligible exterior daytime impact [0 to 2 dB(A)] and moderate to major exterior nighttime impact [9 to 12 dB(A)]*.
<b>6: River Center</b> <b>Project Site:</b> <b>CSX –</b> <b>Kingsworth</b> <b>/ NS –</b> <b>Hospital</b>	Negligible impact [0 to 2 dB(A)]. Minor to Moderate impact [4 to 7 dB(A)] along one future road.	Minor to Moderate impact [(3 to 10 dB(A)] along several segments due to increased rail activity and new track builds. Moderate impact [(5 to 10 dB(A)] along one new build future segment.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.
<b>7: River Center</b> <b>Project Site:</b> <b>CSX &amp; NS –</b> <b>Milford</b>	Negligible impact [0 to 2 dB(A)]. Minor to Moderate impact [4 to 7 dB(A)] along one future road.	Minor to Moderate impact [(3 to 10 dB(A)] along several segments due to increased rail activity in the southern alignment. Moderate impact [(5 to 10 dB(A)] along one new build future segment.	Similar to the Proposed Project Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.

\*Refer to subsections 4.12.3.5 and 4.12.7.5 for information on exterior to interior noise reduction.  
Interior noise levels are not anticipated to disrupt sleep.

The impacts indicated in the table for each noise category listed relate to different groups of affected receptors, which are analyzed separately in this document and Appendix H. For example, receptors that would experience rail noise impact (located along certain track segments), would not be subject to noise impacts from vehicular traffic, ICTF construction or ICTF operations; the only additional impact for those receptors would potentially be from rail vibration, but these impacts are negligible as the receptors are located too far from the rail line to experience an impact.

There is an exception to this conclusion: Under the River Center project site Alternatives 5, 6 and 7, the future Port Drayage Road and a new build rail segment (No. 10) from Pittsburg Avenue to the ICTF facility would both run in parallel to the Navy Base western property line along the Chicora-Cherokee community. In comparison with the 2038 No-Action Alternative noise levels in the community, the combined traffic and rail noise impacts for the nearest 18 to 23 residential receptors would be moderate [5 to 10 dB(A)] at daytime and could elevate to major noise impacts [up to 16 dB(A)] at nighttime depending on the truck and train schedules of operation.

#### **4.12.11 Mitigation**

##### **4.12.11.1 Applicant's Proposed Avoidance and Minimization Measures**

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Use state-of-the-art equipment, such as electric wide-span gantry cranes, that minimize sound emissions during operations. (Minimization)
- Implement a 100-foot buffer to reduce the impacts of vibrations from construction and operations of the ICTF. (Minimization)
- \*The existing topography of the North Lead will require a substantial cut section to provide adequate grades to accommodate train movements. This cut section will mitigate visual and noise impacts that may result from the movement of trains in and out of the ICTF from the north. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to noise and vibrations is also provided in Chapter 6.

##### **4.12.11.2 Additional Potential Mitigation Measures**

No additional mitigation measures have been recommended by the Corps.

## 4.13 AIR QUALITY

### 4.13.1 Methods and Impact Definitions

Impacts on Air Quality by the Proposed Project and alternatives were evaluated by estimating the criteria pollutant and Hazardous Air Pollutant (HAP) emissions associated with the construction and operation of the Proposed Project and alternatives. As discussed in Chapter 3, criteria pollutants of concern for this project include CO, NO<sub>2</sub>, O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub>. NO<sub>2</sub> impacts are commonly evaluated by analyzing NO<sub>x</sub>, which is done in this analysis. O<sub>3</sub> is not directly emitted, but rather formed in the air through a photochemical reaction of NO<sub>x</sub> and VOCs, referred to as O<sub>3</sub> precursors. O<sub>3</sub> impacts are evaluated by analyzing NO<sub>x</sub> and VOC emissions. All sources of criteria pollutant and HAP emissions that were reasonably foreseeable were included in this analysis. Air emissions were evaluated for the full build-out year, 2038, to best represent the air emissions at full operating capacity. Accordingly, 2038 criteria pollutant and HAP emissions inventories represent the criteria pollutant and HAP emissions for all operating years after 2038, and a conservative estimate for interim years between opening year, 2018, and full build-out.

#### 4.13.1.1 Construction NAAQS Emissions Inventory

Construction period criteria pollutant emissions inventories of CO, NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, and VOCs included emissions from construction equipment exhaust, haul truck trips for importing and exporting material, and worker and vendor commute to and from the construction sites. Pollutant emissions would also be caused by off-gassing emissions from solvents in architectural paints and asphalt paving. Additionally, particulate matter would be emitted from surface disturbance activities, building demolition, the material movement of imports and exports, and on-road vehicle activity. Pollutant emissions from each of these activities were quantified using the EPA Motor Vehicle Emissions Simulator (MOVES) model, EPA guidance, activity information provided by Palmetto Railways, and assumptions and other sources where necessary. All criteria pollutant emission calculations, assumptions, guidance references, data, and model runs are included in the Air Quality and Climate Change Technical Memorandum (Appendix I).

#### 4.13.1.2 Operational NAAQS Criteria Pollutant Emissions Inventory

Operational criteria pollutant emissions of CO, NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, and VOCs included emissions from locomotive activity, Over-the-Road (OTR) truck trips and idling, Utility Tractor Rig (UTR) truck trips and idling, and worker commute. Locomotive pollutant emissions were estimated for off-terminal line haul activity, on-terminal line haul activity, and switch locomotive activity. Line haul locomotives are used to move freight. Switch locomotives are used to put rail cars together to form trains within or around a railyard. They are also referred to as “switchers.” Pollutant emissions from each of these activities were quantified using the EPA Motor Vehicle Emissions Simulator (MOVES) model, EPA guidance, activity information provided by Palmetto Railways, and assumptions and



other sources where necessary. It is common for intermodal container transfer facilities to use off-road equipment such as forklifts and cranes in its operations; however, the Proposed Project and alternatives would utilize electric equipment, including gantry cranes. Electric equipment does not directly emit air pollutants so pollutant emissions from these sources are not quantified. All criteria pollutant emission calculations, assumptions, and model runs are included in Appendix I.

#### 4.13.1.3 NAAQS Dispersion Modeling

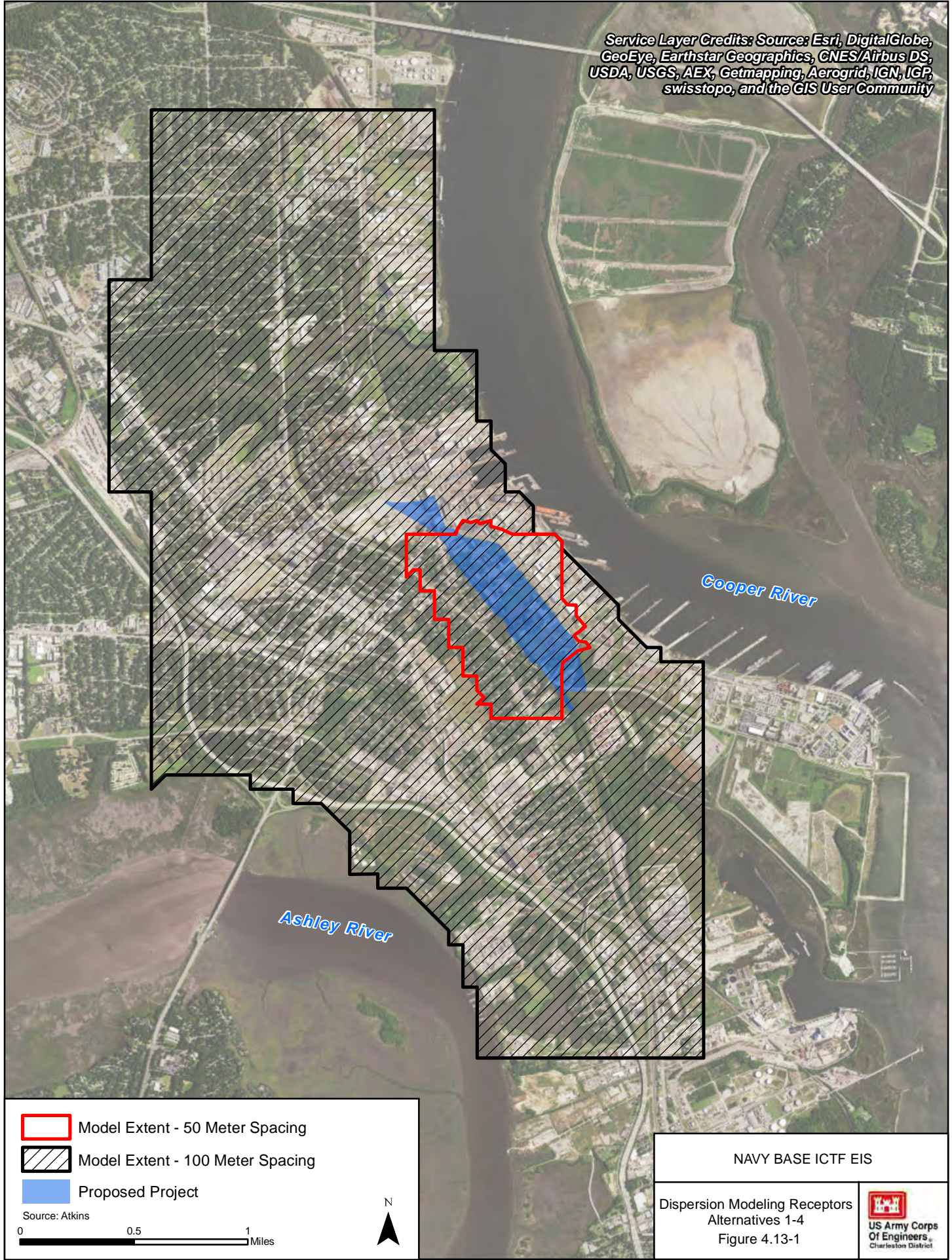
In addition to criteria pollutant emissions inventories, which are reported in tons of each pollutant, dispersion modeling was included in this analysis to evaluate the Proposed Project's and alternatives' compliance with the of CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub> NAAQS. All dispersion modeling calculations, assumptions, data, and model runs are included in Appendix I. As discussed in section 3.13, lead would not be emitted from the Proposed Project and alternatives, and is not included in this analysis. Ozone is not emitted directly from the combustion of fuels, but is formed through photochemical reactions. Ozone is generally modelled at the regional scale and is not included in the dispersion modeling of this analysis. While emissions inventories provide valuable information of how much of each pollutant the Proposed Project and alternatives would emit annually, the inventories do not show how much of each pollutant would be in the air at any given time or location. Therefore, an air emissions inventory alone does not provide a direct correlation to air pollutant concentrations. When a pollutant is emitted from a source, such as exhaust from a passenger car, it is dispersed in the air and becomes less potent or less concentrated as it is dispersed. Concentration of the criteria pollutants emitted from the operation of the Proposed Project and alternatives were estimated using the AERMOD Dispersion Model.

The AERMOD Dispersion Model was selected as the appropriate dispersion model for criteria pollutants because it is a preferred or recommended dispersion model as listed in Appendix W by the EPA (USEPA 2005). The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) was formed to introduce state-of-the-art modeling concepts into the EPA's air quality models. Through AERMIC, the modeling system, AERMOD, was introduced that incorporated air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. The AERMOD Dispersion Model is a stationary source dispersion model. Although many of the pollutant sources of the Proposed Project and alternatives would be considered mobile sources, such as the UTR and OTR trucks traveling on roadways, these can be modeled as line sources in AERMOD, as is supported in SCDHEC guidance (SCDHEC 2001). For these reasons, AERMOD was selected as the appropriate dispersion model for criteria pollutants.

AERMOD requires meteorological, terrain, receptor, and pollutant source data inputs. Meteorology and terrain data were taken from SCDHEC. The model receptor grid extents and spacing included in the dispersion modeling for the Proposed Project and alternatives are shown in Figure 4.13-1 and



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- Model Extent - 50 Meter Spacing
- Model Extent - 100 Meter Spacing
- Proposed Project

Source: Atkins

0 0.5 1 Miles



NAVY BASE ICTF EIS

Dispersion Modeling Receptors  
Alternatives 1-4  
Figure 4.13-1





Figure 4.13-2. Receptors grids were placed in the study area at 50 meters spacing between the boundaries of the project site and River Center project site and 300 meters from them. Receptors grids were then placed at 100 meters spacing from 300 meters from the sites to at least a quarter mile (1,320 feet) from the pollutant sources. More information on the model receptor grid is provided in Appendix I. The sources included in the model were proposed off-terminal line haul rail, on-terminal line haul rail, switch locomotives, UTR trucks on the private drayage road, UTR truck on-site idling, OTR trucks on public roads, OTR truck on-site idling, and on-road passenger vehicles. The OTR truck activity and worker commute from the Proposed Project and alternatives on public roadways could not be isolated. Rather, all passenger car and truck traffic were included in the roadway sources, as is presented in the transportation analysis (Appendix F – Transportation Technical Memorandum). The analysis in Appendix F includes over 200 roadway links; however, this air quality analysis has a more narrowed scope and does not need all roadways links modeled to provide a reasonable estimate of air quality impacts. To reduce the number of roadway links included in the air dispersion model, a screening process was applied which limited the public roadways.

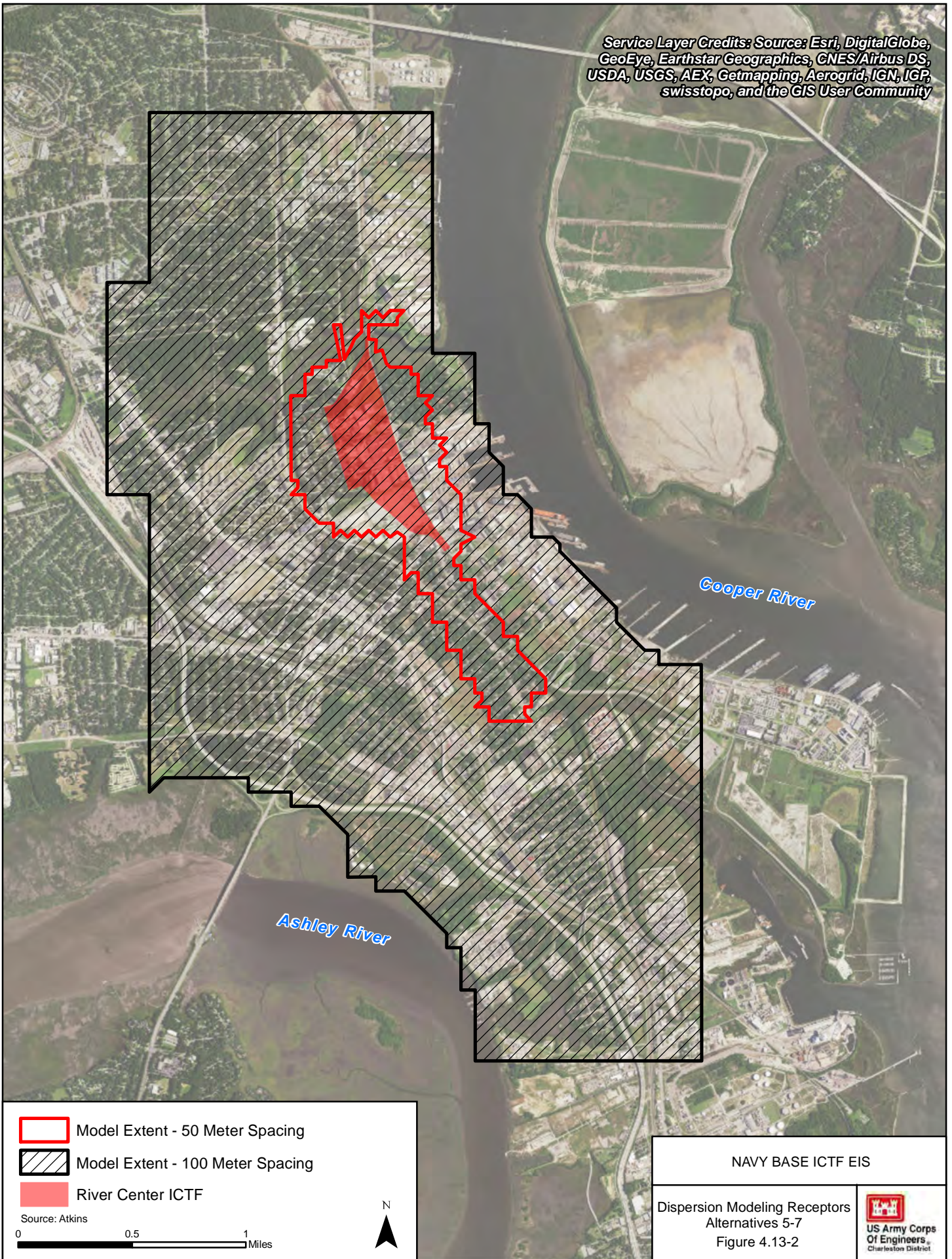
Model source input emission rates were developed for each source from the same data used to develop the operational criteria pollutant emissions inventories, as well as additional data taken from the Appendix F and other sources as necessary. In addition to emission rates, the pollutant sources in the AERMOD model also included inputs for plume width, plume height, and flagpole receptor height. To analyze criteria pollutant air quality impacts, the model outputs were added to the ambient air concentrations and pollutant concentration anticipated from the HLT at the CNC, which had not yet been operating at the time of the most recent ambient air monitoring. The sum of these three concentrations represents the total estimated pollutant concentrations at the full build-out of the Proposed Project and were compared to the NAAQS. All dispersion modeling calculations, assumptions, data, and model runs are included in Appendix I.

#### 4.13.1.4 Hazardous Air Pollutants (HAPs)

The Clean Air Act Amendments of 1990 listed 188 hazardous air pollutant (HAPs) and addressed the need to control toxic emissions from transportation. In 2001, EPA issued its first Mobile Source Air Toxics Rule, which identified 21 mobile source air toxic (MSAT) compounds as being HAPs that required regulation. In addition, EPA identified six compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment. These are acrolein, benzene, 1, 3-butadiene, diesel particulate matter plus diesel exhaust organic gases (DPM), formaldehyde, naphthalene, and polycyclic organic matter. Therefore, this analysis focuses on the 7 “priority” MSAT. Of the 7 priority MSAT, DPM risk has been quantified and disclosed in the Health Risk Assessment section for the Proposed Project and alternatives. Further, DPM has become the dominant MSAT of concern. The remaining 6 MSAT (non-DPM HAPs) present a substantially lower health risk and, unlike the criteria pollutants, toxics do not



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have NAAQS, making evaluation of their impacts more subjective; however, generation of the non-DPM HAPs is provided herein for disclosure purposes. Acrolein is a prevalent pollutant in many communities; however, results of a short-term laboratory study conducted in 2010 raised significant questions about the consistency and reliability of acrolein monitoring results. It is one of the most difficult chemicals to measure in the air because it reacts easily with other chemicals to form other compounds thus complicating laboratory analysis. This means that although monitors detect acrolein in the air, precisely how much cannot be determined. In light of this uncertainty, EPA did not use acrolein monitoring data in evaluating the potential for health risks from exposure to air toxics in the School Air Toxics Monitoring Project. The EPA concluded that additional work is necessary to improve the accuracy of acrolein sample collection and analytical methods and is in the process of evaluating promising new technologies that may provide accurate data (USEPA 2013). Although acrolein is a prevalent pollutant in many communities, quantifying it would include a higher level of uncertainty compared to the other listed HAPs. Therefore, acrolein was not quantified in this analysis. Once emissions inventories were completed for each project alternative, the amount of non-DPM HAPs emitted were calculated. Non-DPM HAPs are determined as a ratio of criteria pollutants (i.e., VOC) discharged (Table 4.13-1). The ratios were obtained from EPA document *Air Toxic Emissions from On-Road Vehicles in MOVES2014* and are detailed in the table below (USEPA 2015a).

Table 4.13-1  
HAP Ratios

Priority MSAT (non-DPM HAP) <sup>(1)</sup>	Proxy Pollutant	Ratio of MSAT to Proxy Pollutant
Benzene	VOC	0.01291
1,3-Butadiene	VOC	0.00080
Formaldehyde	VOC	0.21744
Naphthalene	VOC	0.01630
Polycyclic organic matter <sup>(2)</sup>	VOC	0.00130

(1) Acrolein is a non-DPM HAP, however it was not quantified due to its level of uncertainty.

(2) Polycyclic organic matter defines a broad class of compounds that includes polycyclic aromatic compounds. The EPA document, *Air Toxic Emissions from On-Road Vehicles in MOVES2014*, provides ratios for fifteen polycyclic aromatic compounds. A sum of the ratios for the fifteen compounds was used to represent the overall ratio for polycyclic organic matter.

Notes: All ratios were taken for 2007 and later diesel vehicles.

Source: USEPA 2015a

#### 4.13.1.5 Health Risk Assessment

A human health risk assessment is the process to estimate the nature and probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media, now or in the future. An evaluation of DPM was conducted using EPA protocols as listed in the Air Toxics Risk Assessment Reference Library Volume 1 (USEPA 2004). A human health risk assessment includes four basic steps, presented below.

**Planning, Scoping, and Problem Formulation** is performed to identify the assessment questions, state the quantity and quality of data needed to answer those questions, establish the scope of this analysis, provide an in-depth discussion of how the analysis will be done, outline timing and resource considerations, identify product and documentation needs, and identify who will participate in the overall process from start to finish, along with their roles. During this process, an identification and evaluation of available data and ancillary information about the study area will be performed to help identify key chemicals, sources, and potential exposures, to determine what kind of analyses can be performed, and to establish the data gaps which need to be filled.

As described above, DPM is the HAP of concern for the Proposed Project and alternatives. The primary source of DPM associated with the Proposed Project and alternatives is diesel engines including the truck (UTR and OTR) and rail activity (line haul and switch locomotives). The concentration of DPM in the air would be necessary in evaluating its associated risk. DPM concentrations resulting from the Proposed Project and alternatives were modeled using the AERMOD dispersion model. The AERMOD Dispersion Model was selected as the appropriate dispersion model for DPM for the same reasons listed in section 4.13.1.3. The same data used in modeling criteria pollutants were also used for modeling DPM. All data, assumptions, and model information is provided in Appendix I.

**Exposure Assessment** is conducted to identify: (1) who is potentially exposed to air toxics; (2) what chemicals they may be exposed to; and (3) how they may be exposed to those chemicals, including the concentrations of chemicals in the air they breathe in.

Those who would be potentially exposed to air toxics from the Proposed Project and alternatives are people residing near the project site and River Center project site. Residences within a quarter mile (1,320 feet) from the pollutant sources were included in the analysis. This population would be exposed to HAPs in the air; however, DPM is the pollutant of concern for this analysis because the other HAPs, which are listed in section 4.13.1.4, present a substantially lower health risk.

There are two exposure durations that are commonly used in exposure assessments: acute and chronic. Acute exposure refers to situations in which the exposure occurs over a short period of time (usually minutes, hours, or a day) and usually at relatively high concentrations. The averaging times commonly used to represent acute exposures concentrations are a 24-hour average, a one-hour average, or a 15-minute average. Acute exposure may result in immediate respiratory and sensory irritation, chemical burns, narcosis, eye damage, and various other effects. Acute exposures also may result in longer-term health effects. Chronic exposure refers to situations in which the exposure occurs repeatedly over a long period of time (usually years to lifetime). Chronic exposures are relatively low in concentration and may result in health effects that do not show up immediately and that persist over the long term, such as cardiovascular disease, respiratory disease, liver and kidney disease, reproductive effects, neurological damage, and cancer (USEPA 2004). Chronic exposure was



included in this analysis due to the operational lifetime of the Proposed Project and alternatives, as well as the more severe health effects associated with chronic exposure.

**Toxicity Assessment** considers: (1) the types of adverse health effects associated with exposure to the chemicals in question; (2) the exposure circumstances associated with the effects (e.g., inhalation vs ingestion), and (3) the relationship between the amount of exposure and the resulting response (commonly referred to as the dose-response relationship).

DPM contains significant levels of fine particulates, which pose a significant health risk because they can pass through the nose and throat and lodge themselves in the lungs. These fine particles can cause lung damage and premature death. They can also aggravate conditions such as asthma and bronchitis. In addition, in its health assessment for diesel engine exhaust, EPA concluded that chronic inhalation exposure is likely to pose a lung cancer hazard to humans (USEPA 2006b).

Depending on the type of effect and the chemical, there are two types of dose-response values that traditionally may be derived: predictive cancer risk estimates, such as the inhalation unit risk estimate (IUR), and predictive non-cancer estimates, such as the reference concentration (RfC). Both types of dose-response values may be developed for the same chemical, as appropriate. The IUR is the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent via inhalation per  $\mu\text{g}/\text{m}^3$  over a lifetime. The EPA's Office of Air Quality Planning and Standards has chronic toxicological values for risk assessments of HAPs, however there is none listed for the IUR of diesel engine emissions (USEPA 2014e). The California Air Resources Board (ARB), which is part of the California EPA, published a report on diesel exhaust that reviewed human epidemiological studies of occupationally exposed populations, which are useful for quantitative risk assessment. The report demonstrated that the IUR based on human epidemiological data ranges from  $1.3 \times 10^{-4}$  to  $2.4 \times 10^{-3} (\mu\text{g}/\text{m}^3)^{-1}$ . After considering the results of the meta-analysis of human studies, as well as the detailed analysis of railroad workers, the report concludes that  $3 \times 10^{-4} (\mu\text{g}/\text{m}^3)^{-1}$  is a reasonable estimate of unit risk expressed in terms of diesel particulate (ARB 1998). Thus this IUR is used in this analysis.

The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subpopulations) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfC is generally used in noncancer health assessments. The RfC of DPM is  $5 \mu\text{g}/\text{m}^3$  (USEPA 2014e).

**Risk Characterization** is the integration of information on hazard, exposure, and toxicity to provide an estimate of the likelihood that any of the identified adverse effects would occur in exposed people. Specifically, chemical-specific dose-response toxicity information is mathematically combined with modeled or monitored exposure estimates to give numbers that represent estimates of the potential for the exposure to cause an adverse health outcome. Risk characterization should be transparent, clear, consistent, and reasonable.

Quantification of risk and hazard is the step where exposure concentrations in air are combined with applicable inhalation dose-response values (the IUR and RfC). Predictive excess cancer risk estimates are presented separately from noncancer hazard quotients.

For inhalation exposures, chronic cancer risks for individual air toxics are typically estimated by multiplying the estimate of long-term exposure concentration (EC) by the corresponding IUR for each pollutant to estimate the potential incremental cancer risk for an individual (USEPA 2004):

$$\text{Risk} = \text{EC} \times \text{IUR}$$

Where:

Risk = Cancer risk to an individual (expressed as an upper-bound risk of contracting cancer over a lifetime)

EC = Estimate of long-term inhalation exposure concentration for a specific air toxic

IUR = the corresponding inhalation unit risk estimate for that air toxic

Performing the estimate in this way provides an estimate of the probability of developing cancer over a lifetime due to the exposure in question. Because of the way this equation is written, the underlying presumption is that a person is exposed continuously to the EC for their full lifetime (usually assumed to be 70 years). The EC used in this analysis is the maximum concentration output from the AERMOD dispersion model over a residence. The concentration represents an annual average that is averaged over five years. Model inputs, data, and assumptions are provided in Appendix I.

The potential risks calculated for specific inhalation exposures are excess or incremental risks; that is, they are potential risks that are in addition to those risks already faced by the population under study for reasons other than exposure to air toxics (e.g., hereditary, lifestyle risks such as smoking). Estimates of excess cancer risk are usually expressed as a statistical probability. For example, an additional risk of contracting cancer of one chance in 1,000,000 means that for every 1,000,000 people that are exposed, in the way that we have presumed, one of those people may develop cancer over their lifetime.

For inhalation exposures, noncancer hazards are estimated by dividing the estimate of the chronic inhalation EC by the RfC (USEPA 2004):

$$\text{Noncancer Hazard} = \text{EC} / \text{RfC}$$

Where:

EC = estimate of chronic inhalation exposure to that air toxic; and

RfC = the corresponding reference concentration for that air toxic.

The EC used in this analysis is the maximum concentration output from the AERMOD dispersion model over a residence. The concentration represent an annual average that is averaged over five years. Model inputs, data, and assumptions are provided in Appendix I.

It is important to address variability and uncertainty in risk characterizations, as scientific uncertainty is inherent in the risk assessment process.

Variability refers to true heterogeneity or diversity. For example, among a local community that is exposed to an air toxic originating from the same source, and with all people breathing the same contaminant concentration in ambient air, the risks from inhalation of the contaminated air will still vary among the people in the population. This may be due to differences in exposure (i.e., different people have different exposure frequencies and exposure durations), as well as differences in response (e.g., differences in metabolic processes of chemical uptake into target organs).

Uncertainty occurs because of a lack of knowledge. For example, we can be very certain that different people are exposed to contaminated air for different time periods, but we may be uncertain about how much variability there is in these exposure durations among the people in the population. Data may not be available concerning the amount of time specific people spend indoors at home, outdoors near home, or in other “microenvironments.” Often, it is difficult to distinguish between uncertainty and variability in a risk assessment, particularly if available data are limited. For that reason, in many cases variability can be treated as a type of uncertainty in the risk assessment. Uncertainty is an inherent characteristic of each step of the risk assessment process.

Uncertainty, when applied to the process of risk assessment, is defined as “a lack of knowledge about specific factors, parameters, or models.” Such uncertainties affect the confidence of any risk estimates that were developed for individuals exposed to the substances in question. It is important to keep in mind that many parameter values (e.g., emissions rates) may be *both* uncertain and variable. Also, the presence of uncertainty in risk assessment does not imply that the results of the risk assessment are wrong, but rather that the risks cannot be estimated beyond a certain degree of confidence (USEPA 2004).

There is uncertainty inherent in the IUR and RfC. As described above, the ARB found a range of IUR values, and developed a reasonable value from the range. The RfC is also an estimate, with uncertainty spanning perhaps an order of magnitude. The EC taken from the AERMOD dispersion model also contains uncertainty, from both the AERMOD model inputs as well as the model itself. Even the perfect dispersion model is likely to have deviations from observed concentrations due to variations in unknown conditions (USEPA 2005). The cancer risk equation presumes that a person is continuously exposed to the EC for 70 years. This means that the person would be standing outside their home continuously for 70 years. Further, the EC used in this analysis is the maximum concentration output from the AERMOD dispersion model over a residence. All nearby residents would not be exposed to this maximum concentration. In order to take into account the uncertainties



in the science, the risk numbers used are plausible upper limits of the actual risk based on conservative assumptions. In actuality, the risk is probably somewhat lower than calculated, and in fact may be zero.

The full build-out year (2038) was selected for the HRA rather than the opening year (2018) because the build-out would include full operation of the project and worst-case traffic volumes on public roadways. The level of impact was determined based on the increment cancer risk and noncancer hazard. The No-Action Alternative served as the baseline condition and represents the projected 2038 traffic volumes, and rail operation in the study area without implementation of the Proposed Project. All HRA calculations and assumptions are included in Appendix I.

#### 4.13.1.6 Impact Definitions

Impacts of criteria pollutants on air quality are analyzed by comparing the Proposed Project and alternatives criteria pollutant emissions inventories to the criteria pollutant emissions inventories of the study area (Tri-County area). Impacts are also analyzed by addressing if the criteria pollutant dispersion from the Proposed Project and alternatives would put the Tri-County area into non-attainment with the NAAQS. Impact definitions for criteria pollutants are in Table 4.13-2.

Table 4.13-2  
Impact Definitions, Criteria Pollutants on Air Quality

Negligible	Minor	Major
Criteria pollutant emissions do not occur.	Criteria pollutant emissions would occur but not to the extent of putting the County in Non-Attainment.	Criteria pollutant emissions would occur to the extent of putting the County in Non-Attainment.

On July 28, 1987, Judge Robert Bork, writing for the D.C. Circuit Court of Appeals, remanded the vinyl chloride amendments to EPA, finding that the Agency had placed too great an emphasis on technical feasibility and cost rather than the provision of an “ample margin of safety” as required by the statute. The opinion also laid out a process for making decisions, consistent with the requirements of the law. The Bork opinion held that EPA must first determine a “safe” or “acceptable” level considering only the potential health impacts of the pollutant. In September of 1989, EPA promulgated emission standards for several categories of benzene sources. EPA argued for the consideration of all relevant health information and established “presumptive benchmarks” for risks that would be deemed “acceptable.” The goal, which came to be known as the “fuzzy bright line,” is to protect the greatest number of persons possible to an individual lifetime risk no higher than one in one million and to limit to no higher than approximately 100 in one million the estimated maximum individual risk. The

selection of even “fuzzy” risk targets placed greater emphasis on the development and communication of risk characterization results (USEPA 2006b).

The level of total cancer risk that is of concern is a matter of personal, community, and regulatory judgment. In general, EPA considers excess cancer risks that are below about 1 per million to be so small as to be negligible, and risks above 100 per million to be sufficiently large that some sort of remediation is desirable. Excess cancer risks that range between 1 per million and 100 per million are generally considered to be acceptable.

For noncancer hazard quotient, it is believed that a hazard quotient below 1 would have no appreciable risk that noncancer health effects would occur, although above 1 does not indicate an effect will definitely occur. The larger the hazard quotient value, the more likely it is that an adverse effect may occur (USEPA 2015b). Impact definitions for HAPs are in Table 4.13-3.

Table 4.13-3  
Impact Definitions, Hazardous Air Pollutants on Air Quality

Negligible	Acceptable	Unacceptable
HAPs emissions do not occur. Potential cancer risk would be below 1 per million. Potential noncancer hazard would be below 1.	HAPS emissions would occur. Potential cancer risk would be between 1 per million and 100 per million. Potential noncancer hazard would be above 1, but adverse effects are unlikely to occur.	HAPS emissions would occur. Potential cancer risk would be above 100 per million. Potential noncancer hazard quotient would be above 1 and adverse effects may occur.

## 4.13.2 No-Action Alternative

### 4.13.2.1 Construction Criteria Pollutant Emissions Inventory

Under the No-Action Alternative, application for DA permit would be denied; the Proposed Project would not occur; CSX and NS would undertake operational and structural modifications to Ashley Junction and 7-Mile rail yards; and future use of the Proposed Project and River Center project sites would likely be mixed-use and industrial (e.g., rail-served warehousing distribution center). As such, the site would need to be built for these uses and construction activities would occur. Construction criteria pollutant emissions would be short term. Therefore, impacts resulting from the No-Action Alternative construction criteria pollutant emissions would be minor short-term adverse.

### 4.13.2.2 Operational Criteria Pollutant Emissions Inventory

Under the No-Action Alternative, existing rail yards would facilitate the transfer of the additional containers by rail. CSX and NS would do so by increasing the length of existing trains to accommodate more containers per train. Additional trains and locomotive engines would not be used under the No-

Action Alternative. Therefore, there are no increase in criteria pollutant emissions due to locomotive activity for the No-Action Alternative. It is assumed that the existing facility workers would be sufficient for the increase in container throughput; therefore, there is no increase in criteria pollutant emissions due to worker commute for the No-Action Alternative. Further, under the No-Action Alternative, the Proposed Project and River Center project sites would not be constructed and operated, including the private drayage road. Therefore, it is assumed that additional UTR trucks would not be operated under the No-Action Alternative, and OTR trucks would be used to transport all additional containers from existing terminals to the CSX and NS facilities. It is common for intermodal container transfer facilities to use off-road equipment such as forklifts and cranes in its operations; however, CSX and NS crane and forklift activity was unavailable. Although it is reasonable to assume that some activity would take place, criteria pollutant emissions from on-site off-road equipment was not quantified.

Therefore, criteria pollutant emissions due to operational activities of the No-Action Alternative would include running emissions from OTR truck trips and idling emissions from idling on-site at the Ashley Junction and 7-Mile rail yards. An idle time of 15 minutes was assumed per truckload. The operational criteria pollutant emissions inventory for the No-Action Alternative is in Table 4.13-4 below. Criteria pollutants emitted from the study area (Tri-County area) were taken from the 2011 EPA NEI and compared to the No-Action Alternative inventory in Table 4.13-5 below (USEPA 2015c).

Table 4.13-4  
Annual Operational Criteria Pollutant Emissions Inventory, No-Action Alternative

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Off-Terminal Line Haul Locomotive	0	0	0	0	0	0
On-Terminal Line Haul Locomotive	0	0	0	0	0	0
Switch Locomotive	0	0	0	0	0	0
UTR Truck Running	0	0	0	0	0	0
UTR Truck Idling	0	0	0	0	0	0
OTR Truck Running	8.4	42.4	0.5	0.5	0.3	2.2
OTR Truck Idling	13.8	29.0	0.1	0.1	<0.1	4.2
Worker Commute	0	0	0	0	0	0
On-site Offroad Equipment	0	0	0	0	0	0
<b>Total</b>	<b>22.1</b>	<b>71.4</b>	<b>0.7</b>	<b>0.6</b>	<b>0.3</b>	<b>6.4</b>

Source: USEPA 2014f.



Table 4.13-5  
Comparison of Study Area Criteria Pollutant Emissions  
Inventory to No-Action Alternative Emissions

Criteria Pollutant	Tri-County Area Emissions Inventory (ton)	No-Action Emissions Compared to Total Inventory (percentage)
CO	230,292.8	0.010%
NO <sub>x</sub>	36,526.0	0.195%
PM <sub>10</sub>	26,159.7	0.003%
PM <sub>2.5</sub>	11,299.7	0.005%
SO <sub>2</sub>	26,442.8	0.001%
VOC	122,145.5	0.005%

Notes: Percentages developed using No-Action Alternative emissions shown in Table 4.13-7.

Source: USEPA 2015c, 2015m.

Criteria pollutant emissions from the No-Action Alternative would equal less than 1 percent of the total criteria pollutants emitted in the study area. Impacts of Criteria Pollutants from the Operational Inventory of the No-Action Alternative would be minor permanent adverse.

#### 4.13.2.3 Criteria Pollutant Dispersion Modeling

As discussed in section 4.13.1.3, OTR truck activity and worker commute on public roadways could not be isolated and so all passenger car and truck traffic were included in the dispersion modeling for the Proposed Project and alternatives. After applying the screening process to the roadway links in the No-Action Alternative, 34 roadway sources were included in the dispersion modeling. All other pollutant sources (locomotive, UTR, and OTR idling activities) were not included in the dispersion modeling for the No-Action Alternative. As such, the air dispersion model outputs for the No-Action Alternative represent the concentrations, ppm, and ppb of criteria pollutants from selected roadway sources in the study area for 2038. These outputs were added to the 2013 ambient air monitoring criteria pollutant levels and the HLT estimated pollutant levels, which were added because they are not reflected in the monitoring for the study area, as the HLT had not yet been operating. No-Action Alternative dispersion modeling outputs, ambient air monitoring levels, estimated HLT emissions, and NAAQS compliance demonstration are included the Table 4.13-6 below.

Table 4.13-6  
Criteria Pollutant Dispersion Modeling, No-Action Alternative

Pollutant		Average Time	AERMOD Output	Ambient Background Level (Monitored)	HLT	Total Impact	NAAQS	NAAQS exceeded?
Carbon Monoxide <sup>(1)</sup>		8-hour	0.046 ppm	0.3 ppm	0.14 ppm	0.486 ppm	9 ppm	No
		1-hour	0.073 ppm	0.6 ppm	0.504 ppm	1.177 ppm	35 ppm	No
Nitrogen Dioxide		1-hour	9.324 ppb	36 ppb	Not Modeled	45.324 ppb	100 ppb	No
		Annual	1.352 ppb	6.66 ppb	1.59 ppb	9.602 ppb	53 ppb	No
Particle Pollution	PM <sub>2.5</sub>	Annual	0.066 µg/m³	8.2 µg/m³	0.006 µg/m³	8.272 µg/m³	12 µg/m³	No
		Annual	0.066 µg/m³	8.2 µg/m³	0.006 µg/m³	8.272 µg/m³	15 µg/m³	No
		24-hour	0.129 µg/m³	20 µg/m³	0.37 µg/m³	20.499 µg/m³	35 µg/m³	No
	PM <sub>10</sub>	24-hour	0.197 µg/m³	42 µg/m³	6.00 µg/m³	48.197 µg/m³	150 µg/m³	No
Sulfur Dioxide <sup>(2)</sup>		1-hour	0.128 ppb	16 ppb	Not Modeled	16.128 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

µg/m<sup>3</sup> = micrograms per cubic meter

NAAQS = National ambient air quality standard.

ppm = parts per million

ppb = parts per billion

The maximum AERMOD impact output over a receptor is shown.

AERMOD outputs are in µg/m<sup>3</sup>. Criteria pollutants in ppm and ppb were converted from µg/m<sup>3</sup> to their appropriate unit.

The NAAQS for PM<sub>2.5</sub> has primary and secondary standards for the annual averaging time; 12 µg/m<sup>3</sup> is the primary standard and 15 µg/m<sup>3</sup> is the secondary standard.

SCPA Marine Container Terminal Impacts are shown for the year 2025, which is its full build-out year. These impacts are added because they are not reflected in the 2013 ambient air monitoring for the study area, as the SCPA Marine Container Terminal had not yet been operating.

(1) CO values for 2013 are not available. The values shown here are those taken in 2010, the most recent year CO was monitored in South Carolina.

(2) 3-hour SO<sub>2</sub> values were not available for 2013. 2012 data was used as a proxy from SCDHEC's Ambient Air Quality Summary for 2012, downloaded from <http://www.scdhec.gov/HomeAndEnvironment/Air/AmbientAir/>.

Sources: SCDHEC 2015a, Lakes 2015, USEPA 2015o.

As shown in Table 4.13-6, criteria pollutants emitted from the No-Action Alternative, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, the No-Action Alternative would not put the Tri-County area into non-attainment for any NAAQS. Impacts to air quality from the No-Action Alternative on criteria pollutants would be minor permanent adverse.

#### 4.13.2.4 Hazardous Air Pollutants (HAPs)

HAPs emitted from the No-Action Alternative the study area (Tri-County area) were taken from the 2011 EPA NEI HAPS and are compared in Table 4.13-7.

Table 4.13-7  
Comparison of Study Area HAP Emissions to No-Action Alternative HAP Emissions

Priority MSAT	No-Action Alternative HAP Emissions (ton)	Tri-County Area HAP Emissions (ton)	Compared Percentage of HAPS from No-Action
Benzene	0.083	566.7	0.015%
1,3-Butadiene	0.005	125.4	0.004%
Formaldehyde	1.394	2,192.6	0.064%
Naphthalene	0.104	1,991.0	0.005%
Polycyclic organic matter	0.008	158.8	0.005%

Notes and Acronyms:

Acrolein is a non-DPM HAP, however it was not quantified or included due to its level of uncertainty.

The EPA NEI 2011 did not include emissions of naphthalene and Polycyclic organic matter. These emissions were calculated from the VOC emissions reported in the EPA NEI 2011 and the MSAT ratios listed in Table 4.13-1.

Source: USEPA 2015a, 2015c, 2015m.

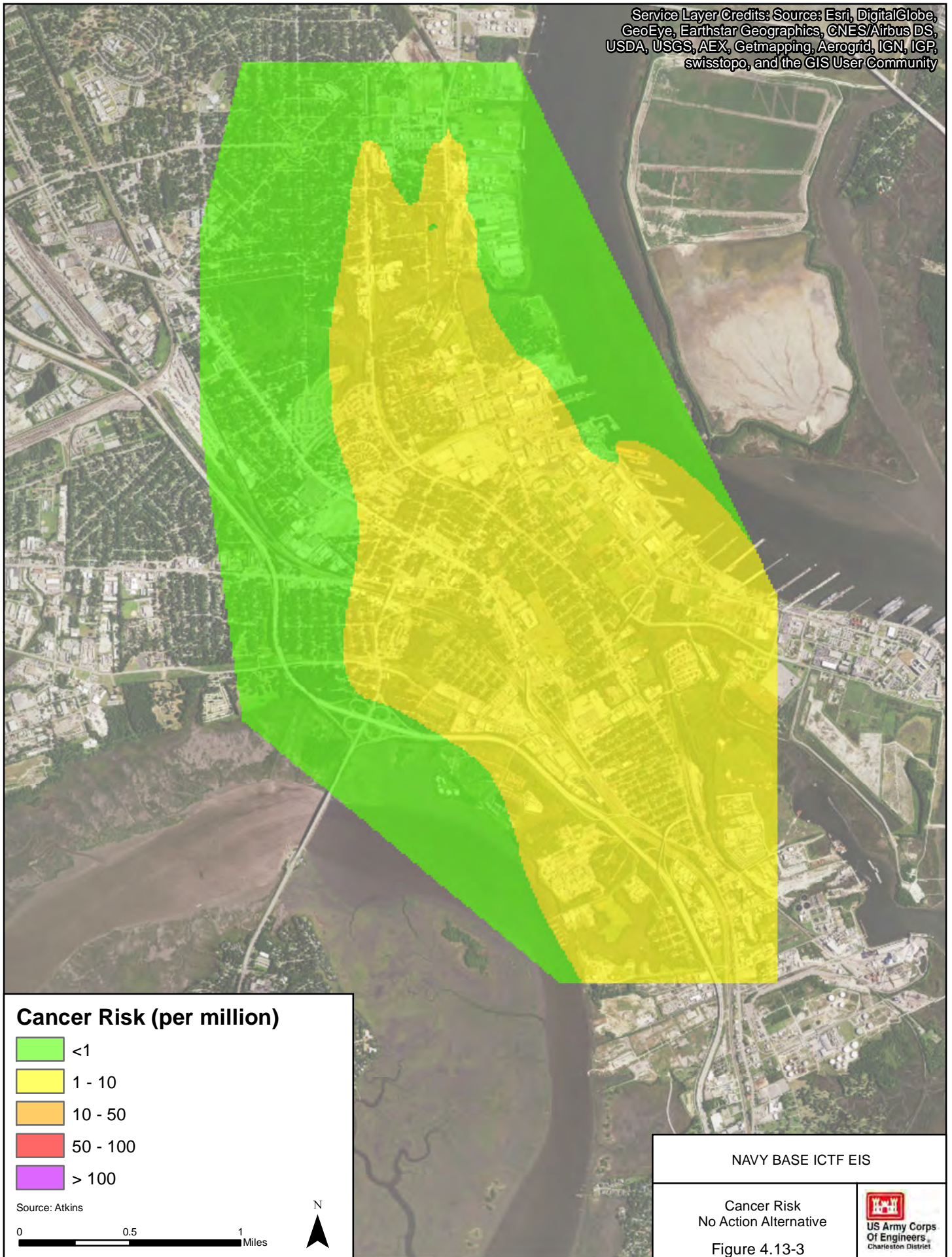
Non-DPM HAP emissions from the No-Action Alternative would each equal less than one-tenth of 1 percent of the total HAPs emitted in the study area. Impacts of non-DPM HAPs from the Operational Inventory of the No-Action Alternative would be acceptable.

#### 4.13.2.5 Health Risk Assessment

The same model inputs and assumptions were used for the DPM dispersion modeling as for the criteria pollutant dispersion modeling, with the exception of gasoline passenger cars being excluded from the DPM modeling, represented as the Worker Commute Source Group. The No-Action Alternative therefore represents the projected 2038 traffic volumes, and rail operation in the study area for selected roadways. Under the No-Action Alternative, existing rail yards would facilitate the transfer of the additional containers by rail. As such, there would not be additional rail, UTR truck, OTR truck idling, or on-site offroad equipment activity at the Proposed Project and River Center project sites. There would be an increase in traffic volumes on public roadways, represented by the OTR Truck Running and Worker Commute Source Groups.

The AERMOD model output is in concentration of DPM ( $\mu\text{g}/\text{m}^3$ ), which is then converted to cancer risk per million people and noncancer hazard. An emission density map of the cancer risk of the No-Action Alternative is in Figure 4.13-3. This figure is presented to demonstrate the dispersion of DPM





and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, data, and HRA calculations are included in Appendix I.

The maximum potential cancer risk is the highest estimated cancer risk at a residence for the No-Action Alternative and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-8. As shown in Table 4.13-8, OTR Truck Running is the only source group contributing to the No-Action Alternative cancer risk. The table also shows the maximum noncancer hazard.

Table 4.13-8  
Cancer Risk and Noncancer Hazard by Source Group, No-Action Alternative

Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.00000	0.00	0.000	0.00%
Switch Rail	0.00000	0.00	0.000	0.00%
UTR Truck Running	0.00000	0.00	0.000	0.00%
UTR Truck Idling	0.00000	0.00	0.000	0.00%
OTR Truck Running	0.03185	9.55	0.006	100.00%
OTR Truck Idling	0.00000	0.00	0.000	0.00%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.03185</b>	<b>9.55</b>	<b>0.006</b>	<b>100.00%</b>

Notes and Acronyms:

DPM = Diesel Particulate Matter

UTR = Utility Tractor Rigs

OTR = Over the Road

The Line Haul Rail Source Group includes emissions from both Off-Terminal Line Haul and On-Terminal Line Haul Rail

UTR Truck Running is from the drayage road.

OTR Truck Running includes all trucks on public roadways.

Worker Commute was not included in DPM dispersion modeling because gasoline passenger cars were the assumed vehicle, which are not DPM sources.

Source: Lakes 2015, USEPA 2004, 2015d.

The maximum potential cancer risk from the No-Action Alternative would occur near the intersection of US Highway 78 (King Street Ext) and Discher because of the proximity of the I-26, US Highway 78, and Meeting Street, which were all included in the dispersion model. The maximum potential cancer risk from the No-Action Alternative falls between 1 per million and 100 per million, which is within the acceptable risk range. When discussing risk it is important to provide the size of risks in context.

The cancer risk is the likelihood, or chance, of getting cancer. The term “excess cancer risk” is used because people also have a “background risk” of about 4 in 10 chances of being diagnosed with cancer in their lifetimes (NCI 2015). In other words, in a million people, it is expected that 400,000 individuals would get cancer from a variety of causes. If there is a “one in a million” excess cancer risk from a given exposure to a contaminant, it means that if one million people are exposed to a carcinogen at a certain concentration over their lifetime, then one cancer above the background chance, or the 400,000th cancer, may appear in those million persons from that particular exposure. To further put risk in perspective, Figure 4.13-4 shows a variety of risks on a scale from 1 chance in 10 (100,000 per million), 1 chance in 10,000 (100 per million), to 1 chance per million (1 per million) (USEPA 1991). A risk of 9.55 per million is close to the equivalent of 1 chance per 100,000 in Figure 4.13-4.

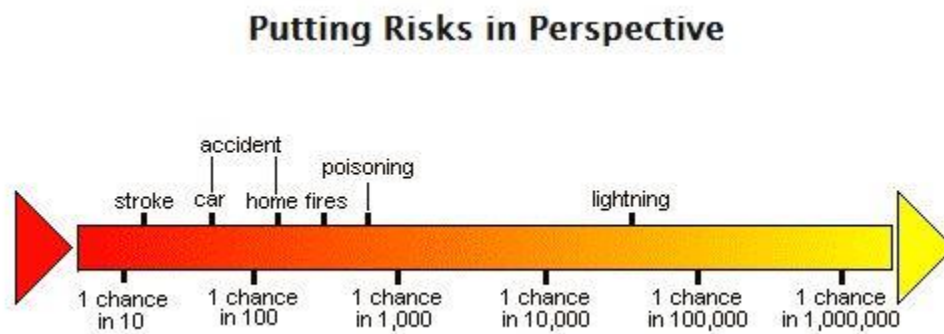


Figure 4.13-4: Putting Risks in Perspective (USEPA 1991)

The maximum potential cancer risk from the No-Action Alternative falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from the No-Action Alternative would be acceptable. The maximum noncancer hazard for the No-Action Alternative would be below 1. Impacts from the No-Action Alternative from noncancer hazard would be negligible.

### 4.13.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

#### 4.13.3.1 Construction Criteria Pollutant Emissions Inventory

Under Alternative 1 (Proposed Project), criteria pollutant emissions from construction activities including operation of construction equipment, haul truck trips for the import and export of material, and commutes by construction workers and vendors would occur. Total criteria pollutant emissions from construction are shown below in Table 4.13-9.



Table 4.13-9  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 1 (Proposed Project)

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	149.5	345.1	22.0	21.4	0.5	36.2
Haul Truck Exhaust	10,305.1	26,701.9	1,158.9	1,124.2	31.7	2,445.3
Worker and Vendor Commute	12.0	1.8	<0.1	<0.1	<0.1	0.3
Architectural Coating	0	0	0	0	0	0.1
Asphalt Paving	0	0	0	0	0	0.2
Demolition	0	0	27.3	4.1	0	0
Surface Disturbance	0	0	2.5	3.1	0	0
Material Movement	0	0	30.0	4.5	0	0
On-Road Fugitive Dust	0	0	0.4	0.1	0	0
<b>Total</b>	<b>10,466.6</b>	<b>27,048.8</b>	<b>1,241.1</b>	<b>1,157.4</b>	<b>32.2</b>	<b>2,482.1</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d, FHWA 2011b, CAPCOA 2013.

Alternative 1 (Proposed Project) construction criteria pollutant emissions would be short term and spread out over five years. Alternative 1 (Proposed Project) construction criteria pollutant emissions would result in a minor short-term adverse effect.

#### 4.13.3.2 Operational Criteria Pollutant Emissions Inventory

Under Alternative 1 (Proposed Project), criteria pollutant emissions from operational activities including operation of locomotives, UTR trucks, OTR trucks, and commutes by workers would occur. Total criteria pollutant emissions from operation are shown below in Table 4.13-10. Criteria pollutants emitted from the study area (Tri-County area) were taken from the 2011 EPA NEI are compared with Alternative 1 (Proposed Project) criteria pollutant emissions inventory in Table 4.13-11.

Table 4.13-10  
Total Annual Operational Criteria Pollutant Emissions Inventory, Alternative 1 (Proposed Project)

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Off-Terminal Line Haul Locomotive	8.1	9.4	0.2	0.1	<0.1	0.4
On-Terminal Line Haul Locomotive	9.2	10.7	0.2	0.2	<0.1	0.4
Switch Locomotive	5.4	3.0	<0.1	<0.1	<0.1	0.2
UTR Truck Running	0.4	1.0	<0.1	<0.1	<0.1	0.4
UTR Truck Idling	0.3	0.8	<0.1	<0.1	<0.1	0.3
OTR Truck Running	3.1	15.5	0.2	0.2	0.1	0.8
OTR Truck Idling	4.8	10.2	<0.1	<0.1	<0.1	1.5
Worker Commute	2.6	0.1	<0.1	<0.1	<0.1	0.5
On-site Offroad Equipment	0	0	0	0	0	0
<b>Total</b>	<b>34.0</b>	<b>50.7</b>	<b>0.7</b>	<b>0.6</b>	<b>0.2</b>	<b>4.6</b>

Sources: USEPA 2010, 2009a, 1998, 2009b, 2015d, SCPA 2013, CAPCOA 2013.

Table 4.13-11  
Comparison of Study Area Criteria Pollutant Emissions Inventory  
to Alternative 1 (Proposed Project) Emissions

Criteria Pollutant	Tri-County Area Emissions Inventory (ton)	Proposed Project Alternative compared to Total Inventory (percentage)
CO	230,292.8	0.015%
NO <sub>x</sub>	36,526.0	0.139%
PM <sub>10</sub>	26,159.7	0.003%
PM <sub>2.5</sub>	11,299.7	0.005%
SO <sub>2</sub>	26,442.8	0.001%
VOC	122,145.5	0.004%

Source: USEPA 2015a, 2015c, 2015m.

Criteria pollutant emissions from Alternative 1 (Proposed Project) would each equal less than 1 percent of the total criteria pollutants emitted in the study area, and as such, criteria pollutants from the operation of Alternative 1 (Proposed Project) would result in a minor permanent adverse impact. It should be noted that with the exception of CO, the No-Action Alternative would emit approximately the same or more criteria pollutants annually than Alternative 1 (Proposed Project). This condition is due to the efficient operations and transport of goods under Alternative 1 (Proposed Project), including the use of Tier 4 switch locomotive engines and Tier 4 UTR trucks at full build-out. Alternative 1 (Proposed Project) would also include a semi-automated facility that would reduce UTR

and OTR truck idle times compared to the No-Action Alternative. All minimization measures applicable to Air Quality are listed in Section 4.13.12.

#### 4.13.3.3 Criteria Pollutant Dispersion Modeling

Under Alternative 1 (Proposed Project), the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from operational activities including operation of locomotives, UTR trucks, OTR trucks, and commutes by workers would occur. After applying the screening process to the roadway links in the alternative, 35 roadway sources were included in the dispersion modeling. All other pollutant sources (locomotive, UTR, and OTR idling activities) were also included in the dispersion modeling for the alternative. As such, the air dispersion model outputs for the alternative represent the concentrations, ppm, and ppb of criteria pollutants from selected roadway sources along with locomotive, UTR running and idling, and OTR idling activities associated with the Proposed Project in the study area for 2038. These outputs were added to the 2013 ambient air monitoring criteria pollutant levels and the SCPA Marine Container Terminal estimated pollutant levels, which were added because they are not reflected in the monitoring for the study area, as the SCPA Marine Container Terminal had not yet been operating. Proposed Project dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included in Table 4.13-12 below. All dispersion modeling assumptions, calculations, and model output are included in Appendix I.

As shown in Table 4.13-12, criteria pollutants emitted from the operation of the Proposed Project, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, the Proposed Project would not put the Tri-County area into non-attainment for any NAAQS. Impacts to air quality from the operation of the Proposed Project on criteria pollutants would be minor permanent adverse.



Table 4.13-12  
Criteria Pollutant Dispersion Modeling, Alternative 1 (Proposed Project)

Pollutant		Average Time	AERMOD eResults	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
Carbon Monoxide <sup>(1)</sup>		8-hour	0.054 ppm	0.3 ppm	0.14 ppm	0.494 ppm	9 ppm	No
		1-hour	0.081 ppm	0.6 ppm	0.504 ppm	1.185 ppm	35 ppm	No
Nitrogen Dioxide		1-hour	56.552 ppb	36 ppb	Not Modeled	92.552 ppb	100 ppb	No
		Annual	5.805 ppb	6.66 ppb	1.59 ppb	14.055 ppb	53 ppb	No
Particle Pollution	PM <sub>2.5</sub>	Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.252 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.622 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	PM <sub>10</sub>	24-hour	0.364 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.364 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
Sulfur Dioxide <sup>(2)</sup>		1-hour	0.167 ppb	16 ppb	Not Modeled	16.167 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

#### 4.13.3.4 Hazardous Air Pollutants (HAPs)

Under Alternative 1 (Proposed Project), the Palmetto Railways Project would be operated as proposed. Operational non-DPM HAP emissions from the Proposed Project Alternative are shown in Table 4.13-13 below and are compared with non-DPM HAPs emitted from the study area.

Table 4.13-13  
Comparison of Study Area HAP Emissions to Alternative 1 (Proposed Project) HAP Emissions

Priority MSAT	Proposed Project Annual Operational HAP Emissions (ton)	Tri-County Area HAP Emissions (ton)	Compared Percentage of HAPS from Alternative 5
Benzene	0.059	566.7	0.010%
1,3-Butadiene	0.004	125.4	0.003%
Formaldehyde	0.990	2,192.6	0.045%
Naphthalene	0.074	1,991.0	0.004%
Polycyclic organic matter	0.006	158.8	0.004%

Source: USEPA 2015a, 2015c, 2015m.

Non-DPM HAP emissions from Alternative 1 (Proposed Project) would each contribute to less than one-tenth of 1 percent of the total non-DPM HAPs emitted in the study area. Impacts of non-DPM HAPs from the Operational Inventory of Alternative 1 (Proposed Project) would be acceptable.

#### 4.13.3.5 Health Risk Assessment

Alternative 1 (Proposed Project) includes emissions from line haul and switch rail, UTR trucks running on the private drayage road, UTR and OTR trucks idling on-site, OTR truck running on public roadways. An emission density map of the cancer risk of Alternative 1 (Proposed Project) is in Figure 4.13-5. This figure demonstrates the dispersion of DPM and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, data, and HRA calculations are included in Appendix I.

The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 1 (Proposed Project) and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-14. As shown in Table 4.13-14, line haul rail is the single largest source, contributing 37.73% of the highest estimated cancer risk. Emissions from OTR truck idling are the second largest contributor, at 30.78%. The table also shows the maximum noncancer hazard.

Table 4.13-14  
Cancer Risk and HQ by Source Group, Alternative 1 (Proposed Project)

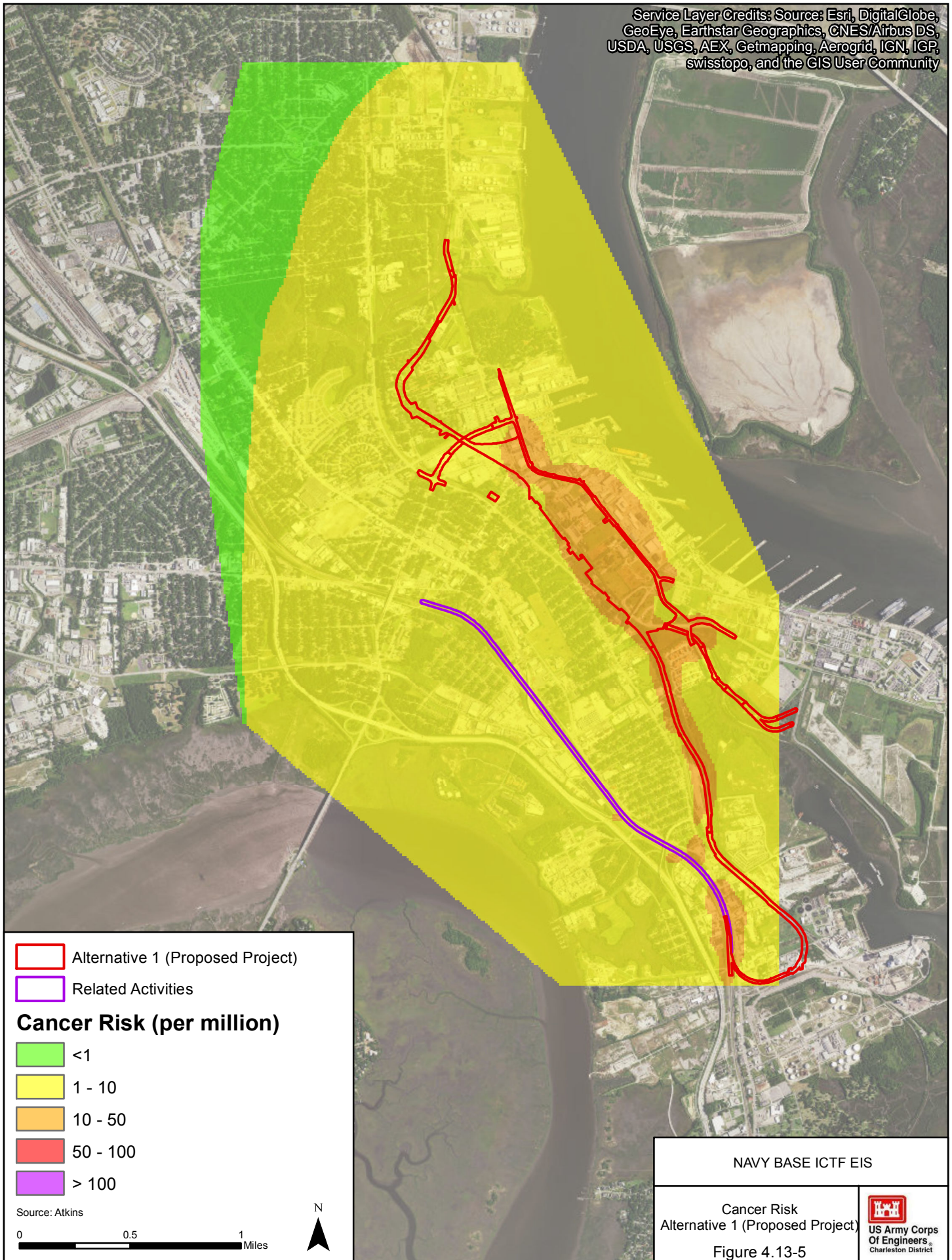
Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.01747	5.24	0.003	37.73%
Switch Rail	0.00107	0.33	0.0002	2.31%
UTR Truck Running	0.00041	0.12	0.00008	0.89%
UTR Truck Idling	0.00536	1.61	0.001	11.58%
OTR Truck Running	0.00774	2.32	0.002	16.72%
OTR Truck Idling	0.01425	4.28	0.003	30.78%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.04630</b>	<b>13.89</b>	<b>0.009</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015, USEPA 2015o 2004.







The maximum potential cancer risk from Alternative 1 (Proposed Project), would occur directly adjacent to the Proposed Project site due to on-site rail and truck activity. The cancer risk falls between the 1 per million and 100 per million, which is within the acceptable risk range. When discussing risk it is important to provide the size of risks in context.

The cancer risk is the likelihood, or chance, of getting cancer. The term “excess cancer risk” is used because people also have a “background risk” of about 4 in 10 chances of being diagnosed with cancer in their lifetimes (NCI 2015). In other words, in a million people, it is expected that 400,000 individuals would get cancer from a variety of causes. If there is a “one in a million” excess cancer risk from a given exposure to a contaminant, it means that if one million people are exposed to a carcinogen at a certain concentration over their lifetime, then one cancer above the background chance, or the 400,000th cancer, may appear in those million persons from that particular exposure. To further put risk in perspective, Figure 4.13-4 shows a variety of risks on a scale from 1 chance in 10 (100,000 per million), 1 chance in 10,000 (100 per million), to 1 chance per million (1 per million) (USEPA 1991). A risk of 13.89 per million is near the equivalent of 1 chance per 100,000 in Figure 4.13-4.

The maximum potential cancer risk from Alternative 1 (Proposed Project) falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 1 (Proposed Project) would be acceptable. The maximum noncancer hazard for Alternative 1 (Proposed Project) would be below 1 per million. Impacts from Alternative 1 (Proposed Project) from noncancer hazard would be negligible.

#### **4.13.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

##### **4.13.4.1      Construction Criteria Pollutant Emissions Inventory**

Under Alternative 2, the Palmetto Railways Project would be constructed as a variation of Alternative 1 (Proposed Project). Alternative 2 differs from Alternative 1 (Proposed Project) on where the northern rail connection for NS would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the NS northern rail connection alignment. As such, construction of the rail alignments differs slightly from Alternative 1 (Proposed Project), and so construction equipment exhaust criteria pollutant emissions are different to reflect the change in length of the NS northern rail connection. Haul truck activities, worker and vendor commute, architectural coating, asphalt paving, material movement, and demolition were assumed to be the same as Alternative 1 (Proposed Project). Total criteria pollutant emissions from construction of Alternative 2 are shown below in Table 4.13-15.

Table 4.13-15  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 2

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	151.7	345.1	22.4	21.7	0.6	36.7
Haul Truck Exhaust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker and Vendor Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Architectural Coating	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Asphalt Paving	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Demolition	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Surface Disturbance	0	0	2.5	3.1	0	0
Material Movement	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Road Fugitive Dust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>10,468.8</b>	<b>27,048.8</b>	<b>1,241.5</b>	<b>1,157.7</b>	<b>32.3</b>	<b>2,482.6</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d, FHWA 2011b, CAPCOA 2013.

Impacts to Air Quality by Alternative 2 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project).

#### **4.13.4.2 Operational Criteria Pollutant Emissions Inventory**

Under Alternative 2, the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from operational activities would be the same as Alternative 1 (Proposed Project) and impacts would be the same as Alternative 1 (Proposed Project).

#### **4.13.4.3 Criteria Pollutant Dispersion Modeling**

Under Alternative 2, the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from the operational activities would be the same as Alternative 1 (Proposed Project), with the exception of where the pollutants would be emitted due to the different rail track segments. Alternative 2 dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included the Table 4.13-21 below. All dispersion modeling assumptions, calculations, and model output are included in Appendix I.

As shown in Table 4.13-16, criteria pollutants emitted from the operation of Alternative 2, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, Alternative 2 would not put the Tri-County area into non-attainment for any criteria pollutants. Impacts to air quality from the operation of Alternative 2 on criteria pollutants would be minor permanent adverse.

#### **4.13.4.4 Hazardous Air Pollutants (HAPs)**

Under Alternative 2, the Palmetto Railways Project would be operated as proposed. As such, HAPs emissions from operational activities would be the same as Alternative 1 (Proposed Project) and impacts would be the same as Alternative 1 (Proposed Project).



Table 4.13-16  
Criteria Pollutant Dispersion Modeling, Alternative 2

Pollutant		Average Time	AERMOD Result	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
<b>Carbon Monoxide</b> <sup>(1)</sup>		8-hour	0.054 ppm	0.3 ppm	0.14 ppm	0.494 ppm	9 ppm	No
		1-hour	0.081 ppm	0.6 ppm	0.504 ppm	1.185 ppm	35 ppm	No
<b>Nitrogen Dioxide</b>		1-hour	56.543 ppb	36 ppb	Not Modeled	92.543 ppb	100 ppb	No
		Annual	5.807 ppb	6.66 ppb	1.59 ppb	14.057 ppb	53 ppb	No
<b>Particle Pollution</b>	<b>PM<sub>2.5</sub></b>	Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.252 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.622 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	<b>PM<sub>10</sub></b>	24-hour	0.362 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.362 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
<b>Sulfur Dioxide</b> <sup>(2)</sup>		1-hour	0.167 ppb	16 ppb	Not Modeled	16.167 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

#### 4.13.4.5 Health Risk Assessment

An emission density map of the excess cancer risk of Alternative 2 is in Figure 4.13-6. This figure demonstrates the dispersion of DPM and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, inputs and outputs, and HRA calculations are included in Appendix I.

The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 2 and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-17. As shown in Table 4.13-17, line haul rail is the single largest source, contributing 37.48 percent of the highest estimated cancer risk. Emissions from OTR truck idling are the second largest contributor, at 30.76%. The table also shows the maximum noncancer hazard.

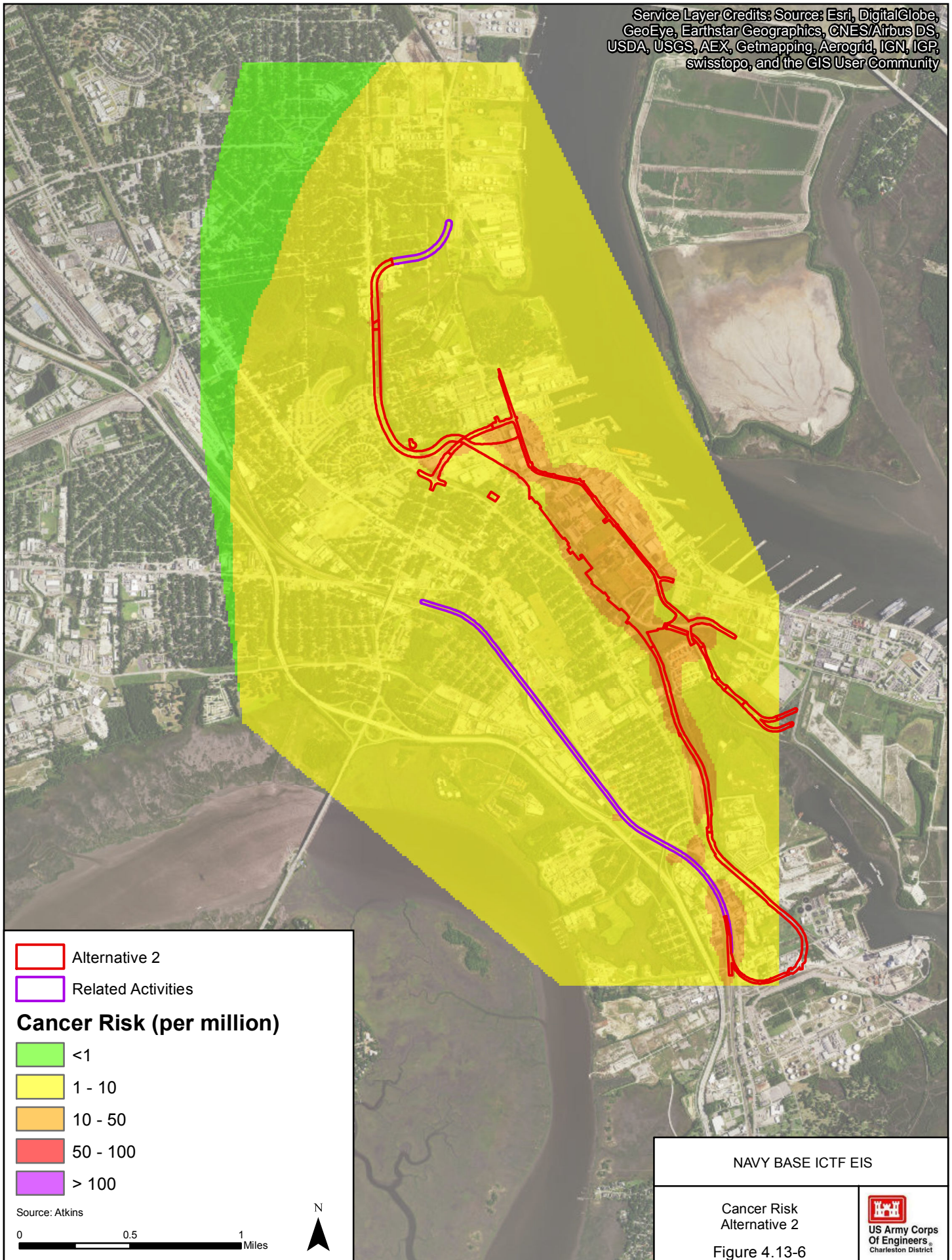




Table 4.13-17  
Cancer Risk and Noncancer Hazard by Source Group

Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.01736	5.21	0.003	37.48%
Switch Rail	0.00107	0.32	0.0002	2.31%
UTR Truck Running	0.00041	0.12	0.00008	0.89%
UTR Truck Idling	0.00536	1.61	0.001	11.57%
OTR Truck Running	0.00787	2.36	0.002	16.99%
OTR Truck Idling	0.01425	4.28	0.003	30.76%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.04632</b>	<b>13.90</b>	<b>0.009</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015; USEPA 2004, 2015o.

The maximum potential cancer risk from Alternative 2 falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 2 would be acceptable. The maximum noncancer hazard for the Alternative 2 would be below 1. Impacts from Alternative 2 from noncancer hazard would be negligible.

### 4.13.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital)

#### 4.13.5.1 Construction Criteria Pollutant Emissions Inventory

Under Alternative 3, the Palmetto Railways Project would be constructed as a variation of Alternative 1 (Proposed Project). Alternative 3 differs from Alternative 1 (Proposed Project) on where the southern rail connection for CSX would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the CSX southern rail connection alignments. As such, construction of the rail alignments differs slightly from Alternative 1 (Proposed Project), and so construction equipment exhaust criteria pollutant emissions are different to reflect the change in length of the CSX southern rail connection. Haul truck activities, worker and vendor commute, architectural coating, asphalt paving, material movement, and demolition were assumed to be the same as Alternative 1 (Proposed Project). Total criteria pollutant emissions from construction of Alternative 3 are shown below in Table 4.13-18.



Table 4.13-18  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 3

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	143.3	330.7	21.1	20.5	0.5	34.7
Haul Truck Exhaust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker and Vendor Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Architectural Coating	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Asphalt Paving	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Demolition	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Surface Disturbance	0	0	2.5	3.1	0	0
Material Movement	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Road Fugitive Dust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>10,460.4</b>	<b>27,034.4</b>	<b>1,240.2</b>	<b>1,156.5</b>	<b>32.2</b>	<b>2,480.6</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d; FHWA 2011b; CAPCOA 2013.

Impacts to Air Quality by Alternative 3 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project).

#### 4.13.5.2 Operational Criteria Pollutant Emissions Inventory

Under Alternative 3, the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from operational activities would be the same as Alternative 1 (Proposed Project) and impacts would be the same as Alternative 1 (Proposed Project).

### 4.13.5.3 Criteria Pollutant Dispersion Modeling

Under Alternative 3, the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from the operational activities would be the same as Alternative 1 (Proposed Project), with the exception of where the pollutants would be emitted due to the different rail track segments. Alternative 3 dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included the Table 4.13-19 below. All dispersion modeling assumptions, calculations, and model output are included in Appendix I.

Table 4.13-19  
Criteria Pollutant Dispersion Modeling, Alternative 3

Pollutant		Average Time	AERMOD Results	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
<b>Carbon Monoxide</b> <sup>(1)</sup>		8-hour	0.054 ppm	0.3 ppm	0.14 ppm	0.494 ppm	9 ppm	No
		1-hour	0.081 ppm	0.6 ppm	0.504 ppm	1.185 ppm	35 ppm	No
<b>Nitrogen Dioxide</b>		1-hour	56.840 ppb	36 ppb	Not Modeled	92.840 ppb	100 ppb	No
		Annual	5.807 ppb	6.66 ppb	1.59 ppb	14.057 ppb	53 ppb	No
<b>Particle Pollution</b>	<b>PM<sub>2.5</sub></b>	Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.252 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.622 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	<b>PM<sub>10</sub></b>	24-hour	0.362 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.362 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
<b>Sulfur Dioxide</b> <sup>(2)</sup>		1-hour	0.167 ppb	16 ppb	Not Modeled	16.167 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

As shown in Table 4.13-19, criteria pollutants emitted from the operation of Alternative 3, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, Alternative 3 would not put the Tri-County area into non-attainment for any criteria pollutants. Impacts to air quality from the operation of Alternative 3 on criteria pollutants would be minor permanent adverse.

#### 4.13.5.4 Hazardous Air Pollutants (HAPs)

Under Alternative 3, the Palmetto Railways Project would be operated as proposed. As such, HAPs emissions from operational activities would be the same as Alternative 1 (Proposed Project) and impacts would be the same as Alternative 1 (Proposed Project).

#### 4.13.5.5 Health Risk Assessment

An emission density map of the cancer risk of Alternative 3 is in Figure 4.13-7. This figure demonstrates the dispersion of DPM and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, inputs and outputs, and HRA calculations are included in Appendix I.

The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 3 and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-20. As shown in Table 4.13-20, line haul rail is the single largest source, contributing 37.71% of the highest estimated cancer risk. Emissions from OTR truck idling are the second largest contributor, at 30.79%. The table also shows the maximum noncancer hazard.

Table 4.13-20  
Cancer Risk and Noncancer Hazard by Source Group, Alternative 3

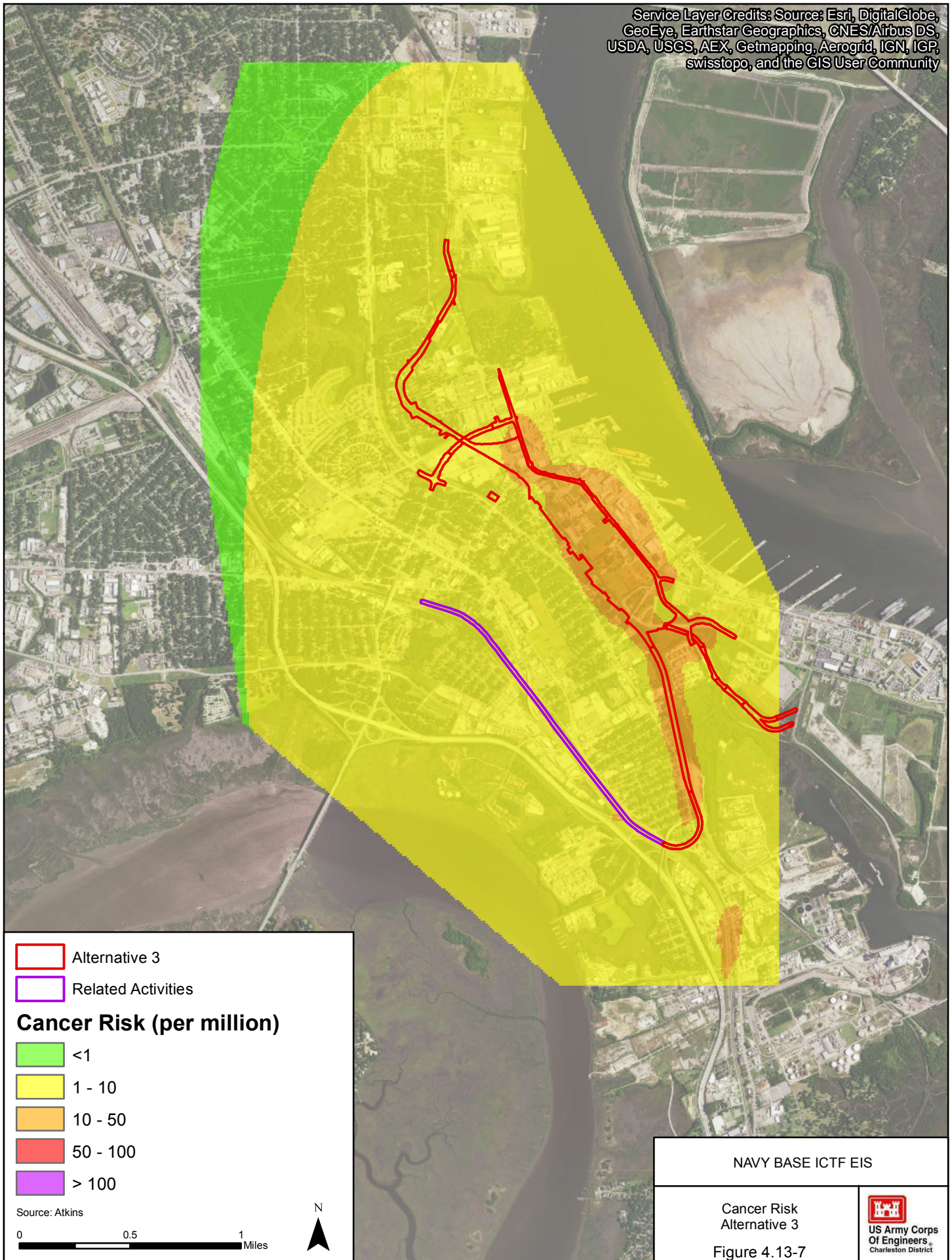
Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.01745	5.24	0.003	37.71%
Switch Rail	0.00107	0.32	0.0002	2.31%
UTR Truck Running	0.00041	0.12	0.00008	0.89%
UTR Truck Idling	0.00536	1.61	0.001	11.58%
OTR Truck Running	0.00774	2.32	0.002	16.72%
OTR Truck Idling	0.01425	4.28	0.003	30.79%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.04628</b>	<b>13.88</b>	<b>0.009</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015; USEPA 2004, 2015o.





The maximum potential cancer risk from Alternative 3 falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 3 would be acceptable. The maximum noncancer hazard for the Alternative 3 would be below 1. Impacts from Alternative 3 from noncancer hazard would be negligible.

#### 4.13.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

##### 4.13.6.1 Construction Criteria Pollutant Emissions Inventory

Under Alternative 4, the Palmetto Railways Project would be constructed as a variation of Alternative 1 (Proposed Project). Alternative 4 differs from Alternative 1 (Proposed Project) on where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection, with NS connecting to an existing NS rail line and proposed rail through the Hospital District would stop short of Noisette Creek. As such, construction of the rail alignments differs from Alternative 1 (Proposed Project), and so construction equipment exhaust GHG emissions are different to reflect the change in length of the NS southern rail connection. Haul truck activities, worker and vendor commute, architectural coating, asphalt paving, material movement, and demolition were assumed to be the same as Alternative 1 (Proposed Project). Total criteria pollutant emissions from construction of Alternative 4 are shown below in Table 4.13-21.

Table 4.13-21  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 4

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	141.9	327.4	20.9	20.3	0.5	34.4
Haul Truck Exhaust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker and Vendor Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Architectural Coating	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Asphalt Paving	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Demolition	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Surface Disturbance	0	0	2.5	3.0	0	0
Material Movement	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Road Fugitive Dust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>10,459.0</b>	<b>27,031.1</b>	<b>1,240.0</b>	<b>1,156.2</b>	<b>32.2</b>	<b>2,480.3</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d, FHWA 2011b, CAPCOA 2013.

Impacts to Air Quality by Alternative 4 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project).

#### 4.13.6.2 Operational Criteria Pollutant Emissions Inventory

Under Alternative 4, the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from operational activities would be the same as Alternative 1 (Proposed Project) and impacts would be the same as Alternative 1 (Proposed Project).

#### 4.13.6.3 Criteria Pollutant Dispersion Modeling

Under Alternative 4, the Palmetto Railways Project would be operated as proposed. As such, criteria pollutant emissions from the operational activities would be the same as Alternative 1 (Proposed Project), with the exception of where the pollutants would be emitted due to the different rail track segments. Alternative 4 dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included the Table 4.13-22 below. All dispersion modeling assumptions, calculations, and model output are included in Appendix I.



Table 4.13-22  
Criteria Pollutant Dispersion Modeling, Alternative 4

Pollutant		Average Time	AERMOD Results	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
<b>Carbon Monoxide</b> <sup>(1)</sup>		8-hour	0.056 ppm	0.3 ppm	0.14 ppm	0.496 ppm	9 ppm	No
		1-hour	0.078 ppm	0.6 ppm	0.504 ppm	1.182 ppm	35 ppm	No
<b>Nitrogen Dioxide</b>		1-hour	60.134 ppb	36 ppb	Not Modeled	96.134 ppb	100 ppb	No
		Annual	5.822 ppb	6.66 ppb	1.59 ppb	14.072 ppb	53 ppb	No
<b>Particle Pollution</b>	<b>PM<sub>2.5</sub></b>	Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.103 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.309 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.252 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.622 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	<b>PM<sub>10</sub></b>	24-hour	0.363 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.363 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
<b>Sulfur Dioxide</b> <sup>(2)</sup>		1-hour	0.170 ppb	16 ppb	Not Modeled	16.170 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

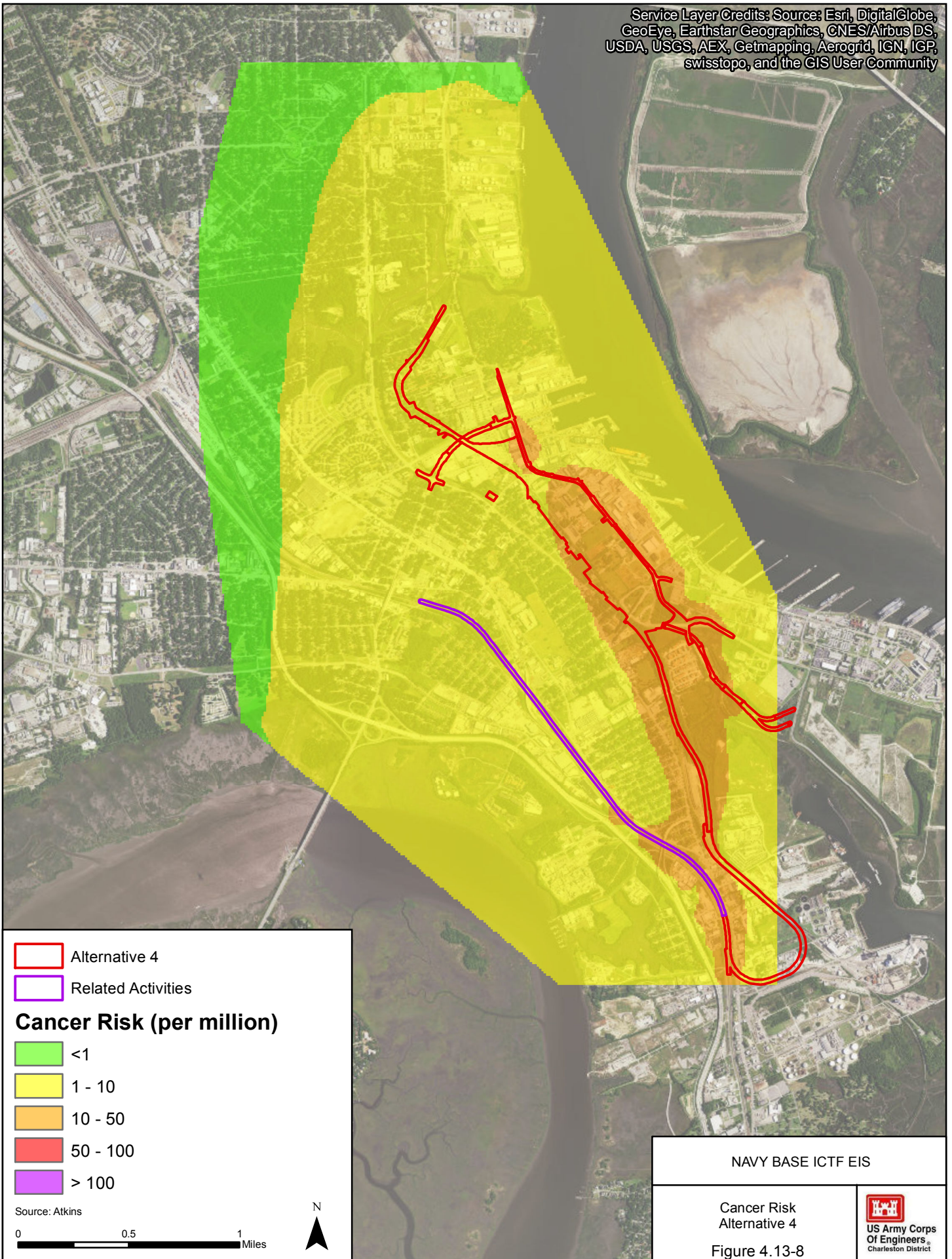
As shown in Table 4.13-22, criteria pollutants emitted from the operation of Alternative 4, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, Alternative 4 would not put the Tri-County area into non-attainment for any criteria pollutants. Impacts to air quality from the operation of Alternative 4 on criteria pollutants would be minor.

#### 4.13.6.4 Hazardous Air Pollutants (HAPs)

Under Alternative 4, the Palmetto Railways Project would be operated as proposed. As such, HAPs emissions from operational activities would be the same as Alternative 1 (Proposed Project) and impacts would be the same as Alternative 1 (Proposed Project).

#### 4.13.6.5 Health Risk Assessment

An emission density map of the cancer risk of Alternative 4 is in Figure 4.13-8. This figure demonstrates the dispersion of DPM and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, inputs and outputs, and HRA calculations are included in Appendix I.





The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 4 and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-23. As shown in Table 4.13-23, line haul rail is the single largest source, contributing 67.39% of the highest estimated cancer risk. Emissions from OTR truck running are the second largest contributor, at 13.71%. The table also shows the maximum noncancer hazard.

Table 4.13-23  
Cancer Risk and Noncancer Hazard by Source Group, Alternative 4

Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.03983	11.95	0.008	67.39%
Switch Rail	0.00194	0.58	0.0004	3.28%
UTR Truck Running	0.00103	0.31	0.0002	1.74%
UTR Truck Idling	0.00224	0.67	0.0005	3.79%
OTR Truck Running	0.00810	2.43	0.002	13.71%
OTR Truck Idling	0.00596	1.79	0.001	10.08%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.05610</b>	<b>17.73</b>	<b>0.01</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015, USEPA 2004, 2015o.

The maximum potential cancer risk from Alternative 4 falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 4 would be acceptable. The maximum noncancer hazard for the Alternative 4 would be below 1. Impacts from Alternative 4 from noncancer hazard would be negligible.

#### 4.13.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

##### 4.13.7.1 Construction Criteria Pollutant Emissions Inventory

Alternative 5 is a variation of the Proposed Project with the ICTF being moved to the River Center project site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. As such, construction of the rail and road alignments differs from the Proposed Project, and so construction equipment exhaust criteria pollutant emissions are different to reflect the change in length of the rail connections and road segments. Haul truck activities, worker and vendor commute, architectural coating, asphalt paving, and material movement were assumed to be the same as Alternative 1 (Proposed Project). Demolition of buildings at the River Center project site



would be different than that for Alternative 1 (Proposed Project) because of the difference in building square footage that would need to be demolished. Total criteria pollutant emissions from construction of Alternative 5 are shown below in Table 4.13-24.

Table 4.13-24  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 5

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	163.7	378.2	24.1	23.4	0.6	39.7
Haul Truck Exhaust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker and Vendor Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Architectural Coating	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Asphalt Paving	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Demolition	0	0	42.6	6.5	0	0
Surface Disturbance	0	0	2.9	3.6	0	0
Material Movement	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Road Fugitive Dust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>10,480.8</b>	<b>27,081.9</b>	<b>1,258.9</b>	<b>1,162.3</b>	<b>32.3</b>	<b>2,485.6</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d, FHWA 2011b, CAPCOA 2013.

Impacts to Air Quality by Alternative 5 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project).

#### 4.13.7.2 Operational Criteria Pollutant Emissions Inventory

Under Alternative 5, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the private drayage road. As such, criteria pollutant emissions from operational activities besides UTR truck running emissions would be the same as Alternative 1

(Proposed Project). The private drayage road in Alternative 5 is 2 miles long, which is twice the distance of the private drayage road in Alternative 1 (Proposed Project). To maintain the daily container throughput, twice as many UTR trucks at the same rate of daily truckloads are required for operating Alternative 5 compared to Alternative 1 (Proposed Project). Therefore, Alternative 5 has twice as many criteria pollutant emissions from UTR truck running as Alternative 1 (Proposed Project). Total criteria pollutant emissions from operation are shown below in Table 4.13-25. Criteria pollutants emitted from the study area (Tri-County area) were taken from the 2011 EPA NEI are compared with Alternative 1 (Proposed Project) criteria pollutant emissions inventory in Table 4.13-26.

Table 4.13-25  
Annual Operational Criteria Pollutant Emissions Inventory, Alternative 5

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Off-Terminal Line Haul Locomotive	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Terminal Line Haul Locomotive	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Switch Locomotive	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
UTR Truck Running	0.8	1.9	0.1	0.1	0.0	0.8
UTR Truck Idling	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
OTR Truck Running	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
OTR Truck Idling	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-site Offroad Equipment	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>34.4</b>	<b>51.6</b>	<b>0.7</b>	<b>0.7</b>	<b>0.2</b>	<b>4.9</b>

Sources: USEPA 2010, 2009a, 1998, 2009b, 2015d, SCPA 2013, CAPCOA 2013.

Table 4.13-26  
Comparison of Study Area Criteria Pollutant Emissions  
Inventory to Alternative 5 Emissions

Criteria Pollutant	Tri-County Area Emissions Inventory (ton)	Proposed Project Alternative Emissions Compared to Total Inventory (percentage)
CO	230,292.8	0.015%
NO <sub>x</sub>	36,526.0	0.141%
PM <sub>10</sub>	26,159.7	0.003%
PM <sub>2.5</sub>	11,299.7	0.005%
SO <sub>2</sub>	26,442.8	0.001%
VOC	122,145.5	0.004%

Source: USEPA 2015a, 2015c, 2015m.

Criteria pollutant emissions from Alternative 5 would each equal less than 1 percent of the total criteria pollutants emitted in the study area. Impacts of criteria pollutants from the operational inventory of Alternative 5 would be minor permanent adverse.

#### 4.13.7.3 Criteria Pollutant Dispersion Modeling

Under Alternative 5, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the private drayage road and the location of where the pollutants would be emitted due to the different rail track segments and site. Alternative 5 dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included the Table 4.13-27 below. All dispersion modeling assumptions, calculations, and model outputs are included in Appendix I.



Table 4.13-27  
Criteria Pollutant Dispersion Modeling, Alternative 5

Pollutant		Average Time	AERMOD Results	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
<b>Carbon Monoxide</b> <sup>(1)</sup>		8-hour	0.058 ppm	0.3 ppm	0.14 ppm	0.498 ppm	9 ppm	No
		1-hour	0.087 ppm	0.6 ppm	0.504 ppm	1.192 ppm	35 ppm	No
<b>Nitrogen Dioxide</b>		1-hour	69.368 ppb	36 ppb	Not Modeled	106.958 ppb	100 ppb	<b>Yes</b>
		Annual	5.613 ppb	6.66 ppb	1.59 ppb	13.863 ppb	53 ppb	No
<b>Particle Pollution</b>	<b>PM<sub>2.5</sub></b>	Annual	0.109 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.315 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.109 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.315 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.405 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.775 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	<b>PM<sub>10</sub></b>	24-hour	0.484 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.484 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
<b>Sulfur Dioxide</b> <sup>(2)</sup>		1-hour	0.140 ppb	16 ppb	Not Modeled	16.140 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

As shown in Table 4.13-27, criteria pollutants emitted from the operation of Alternative 5, along with the existing and projected criteria pollutants, would exceed the NAAQS for 1-hour NO<sub>2</sub>; therefore, Alternative 5 would put the Tri-County area into non-attainment for NO<sub>2</sub>. Under full operation of Alternative 5, the Tri-County area would not remain in compliance with the NAAQS. Impacts to air quality from the operation of Alternative 5 on criteria pollutants would be major adverse.

#### 4.13.7.4 Hazardous Air Pollutants (HAPs)

Under Alternative 5, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 5 would be double the activity in Alternative 1 (Proposed Project) to account for the double length of the private drayage road. Operational non-DPM HAP emissions from Alternative 5 are shown in Table 4.13-28 below and are compared with non-DPM HAPs emitted from the study area.

Table 4.13-28  
Comparison of Study Area HAP Emissions to Alternative 5 HAP Emissions

Priority MSAT	Annual Operational HAP Emissions (ton)	Tri-County Area HAP Emissions (ton)	Compared Percentage of HAPS from Alternative 5
Benzene	0.059	566.7	0.010%
1,3-Butadiene	0.004	125.4	0.003%
Formaldehyde	1.075	2,192.6	0.049%
Naphthalene	0.081	1,991.0	0.004%
Polycyclic organic matter	0.006	158.8	0.004%

Source: USEPA 2015a, 2015c, 2015m.

Non-DPM HAP emissions from Alternative 5 would each contribute to less than one-tenth of 1 percent of the total non-DPM HAPs emitted in the study area. Impacts of non-DPM HAPs from the operational inventory of Alternative 5 would be acceptable.

#### 4.13.7.5 Health Risk Assessment

An emission density map of the cancer risk of Alternative 5 is in Figure 4.13-9. This figure demonstrates the dispersion of DPM and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, inputs and outputs, and HRA calculations are included in Appendix I.

The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 5 and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-29. As shown in Table 4.13-35, OTR Truck idling is the largest source, contributing 39.37% of the highest estimated cancer risk. Emissions from OTR truck running are the second largest contributor, at 29.61%. OTR truck running and idling contributions are higher in this alternative than in Alternatives 1-4 because the OTR truck driveway and on-site truck idling would occur on the western side of the River Center project site, which is closer to the potentially exposed population. The table also shows the maximum noncancer hazard.

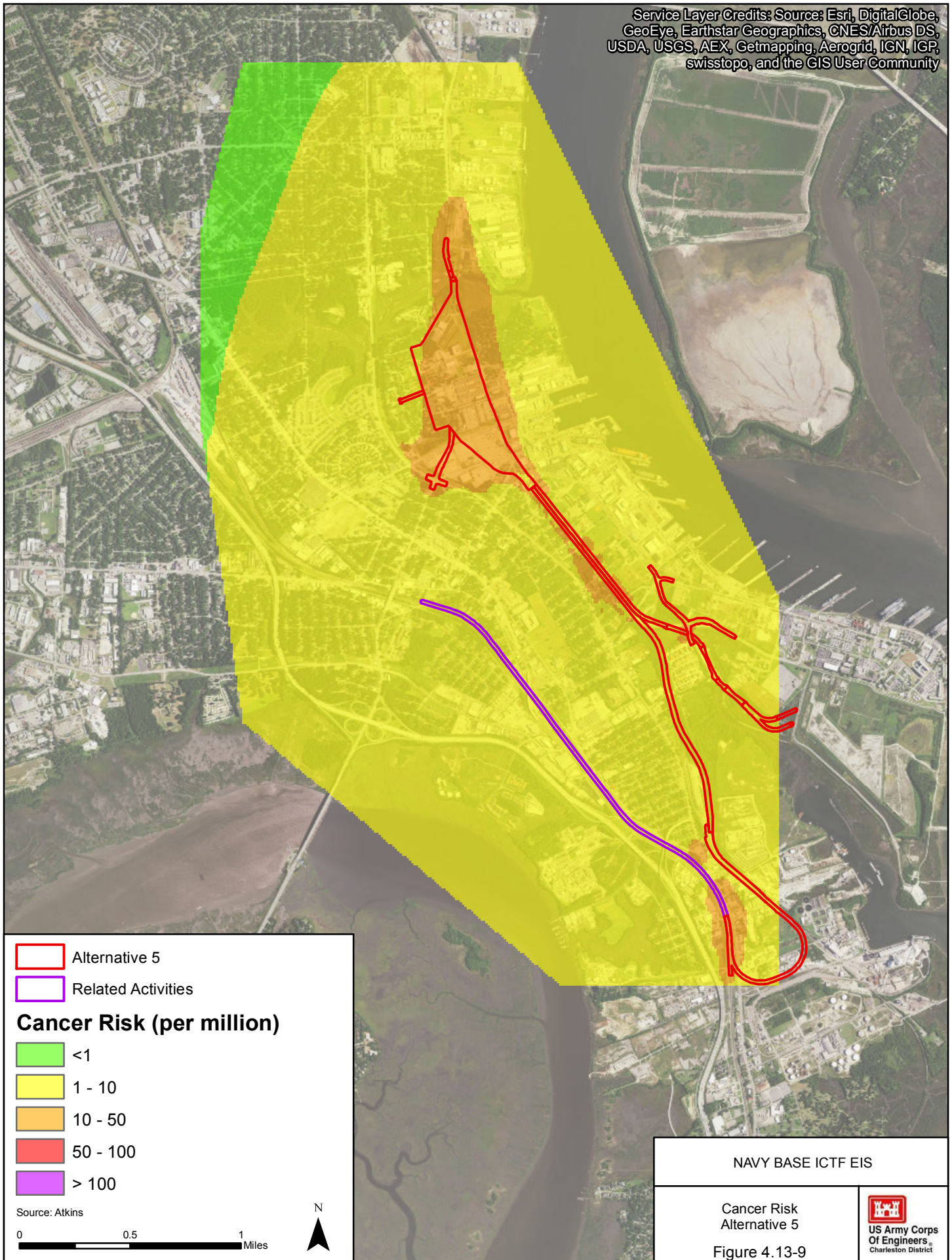




Table 4.13-29  
Cancer Risk and Noncancer Hazard by Source Group, Alternative 5

Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.01099	3.30	0.002	13.29%
Switch Rail	0.00116	0.35	0.0002	1.40%
UTR Truck Running	0.00125	0.38	0.0003	1.51%
UTR Truck Idling	0.01224	3.67	0.002	14.81%
OTR Truck Running	0.02448	7.34	0.005	29.61%
OTR Truck Idling	0.03255	9.77	0.007	39.37%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.08267</b>	<b>24.80</b>	<b>0.02</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015, USEPA 2004 and 2015o.

The maximum potential cancer risk from Alternative 5 falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 5 would be acceptable. The maximum noncancer hazard for the Alternative 5 would be below 1. Impacts from Alternative 5 from noncancer hazard would be negligible.

#### 4.13.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital)

##### 4.13.8.1 Construction Criteria Pollutant Emissions Inventory

Under Alternative 6, a variation of Alternative 1 (Proposed Project) with the ICTF being moved to the River Center project site and the southern rail connection for CSX would connect to an existing CSX rail line. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. As such, construction of the rail and road alignments differs from Alternative 1 (Proposed Project), and so construction equipment exhaust criteria pollutant emissions are different to reflect the change in length of the rail connections and road segments. Haul truck activities, worker and vendor commute, architectural coating, asphalt paving, and material movement were assumed to be the same as Alternative 1 (Proposed Project). Demolition of buildings at the River Center project site would be the same for Alternative 6 as for Alternative 5. Total criteria pollutant emissions from construction of Alternative 6 are shown below in Table 4.13-30.

Table 4.13-30  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 6

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	155.9	360.0	23.0	22.3	0.6	37.9
Haul Truck Exhaust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker and Vendor Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Architectural Coating	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Asphalt Paving	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Demolition	0	0	42.6	6.5	0	0
Surface Disturbance	0	0	2.9	3.6	0	0
Material Movement	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Road Fugitive Dust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>10,473.0</b>	<b>27,063.7</b>	<b>1,257.8</b>	<b>1,161.2</b>	<b>32.3</b>	<b>2,483.8</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d, FHWA 2011b, CAPCOA 2013.

Impacts to Air Quality by Alternative 6 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project).

#### 4.13.8.2 Operational Criteria Pollutant Emissions Inventory

Under Alternative 6, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 6 would be the same as the activity in Alternative 5. As such, criteria pollutant emissions from operational activities would be the same as Alternative 5 and impacts would be the same as Alternative 5.

### 4.13.8.3 Criteria Pollutant Dispersion Modeling

Under Alternative 6, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the private drayage road and the location of where the pollutants would be emitted due to the different rail track segments and site. Alternative 6 dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included the Table 4.13-31 below. All dispersion modeling assumptions, calculations, and model outputs are included in Appendix I.

Table 4.13-31  
Criteria Pollutant Dispersion Modeling, Alternative 6

Pollutant		Average Time	AERMOD Results	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
<b>Carbon Monoxide<sup>(1)</sup></b>		8-hour	0.058 ppm	0.3 ppm	0.14 ppm	0.498 ppm	9 ppm	No
		1-hour	0.087 ppm	0.6 ppm	0.504 ppm	1.192 ppm	35 ppm	No
<b>Nitrogen Dioxide</b>		1-hour	69.369 ppb	36 ppb	Not Modeled	106.959 ppb	100 ppb	<b>Yes</b>
		Annual	5.613 ppb	6.66 ppb	1.59 ppb	13.863 ppb	53 ppb	No
<b>Particle Pollution</b>	<b>PM<sub>2.5</sub></b>	Annual	0.109 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.315 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.109 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.315 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.405 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.775 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	<b>PM<sub>10</sub></b>	24-hour	0.484 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.484 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
<b>Sulfur Dioxide<sup>(2)</sup></b>		1-hour	0.140 ppb	16 ppb	Not Modeled	16.140 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

As shown in Table 4.13-37, criteria pollutants emitted from the operation of Alternative 6, along with the existing and projected criteria pollutants, would exceed the NAAQS for 1-hour NO<sub>2</sub>; therefore, Alternative 6 would put the Tri-County area into non-attainment for NO<sub>2</sub>. Under full operation of Alternative 6, the Tri-County area would not remain in compliance with the NAAQS. Impacts to air quality from the operation of Alternative 6 on criteria pollutants would be major adverse.

### 4.13.8.4 Hazardous Air Pollutants (HAPs)

Under Alternative 6, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 6 would be



the same as the activity in Alternative 5. As such, HAPs emissions from operational activities would be the same as Alternative 5 and impacts would be the same as Alternative 5.

#### 4.13.8.5 Health Risk Assessment

An emission density map of the cancer risk of Alternative 6 is in Figure 4.13-10. This figure demonstrates the dispersion of DPM and corresponding health risk over all of the potentially exposed population. All dispersion modeling assumptions, inputs and outputs, and HRA calculations are included in Appendix I.

The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 6 and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-32. As shown in Table 4.13-32, OTR Truck idling is the largest source, contributing 39.38% of the highest estimated cancer risk. Emissions from OTR truck running are the second largest contributor, at 29.62%. The table also shows the maximum noncancer hazard.

Table 4.13-32  
Cancer Risk and Noncancer Hazard by Source Group, Alternative 6

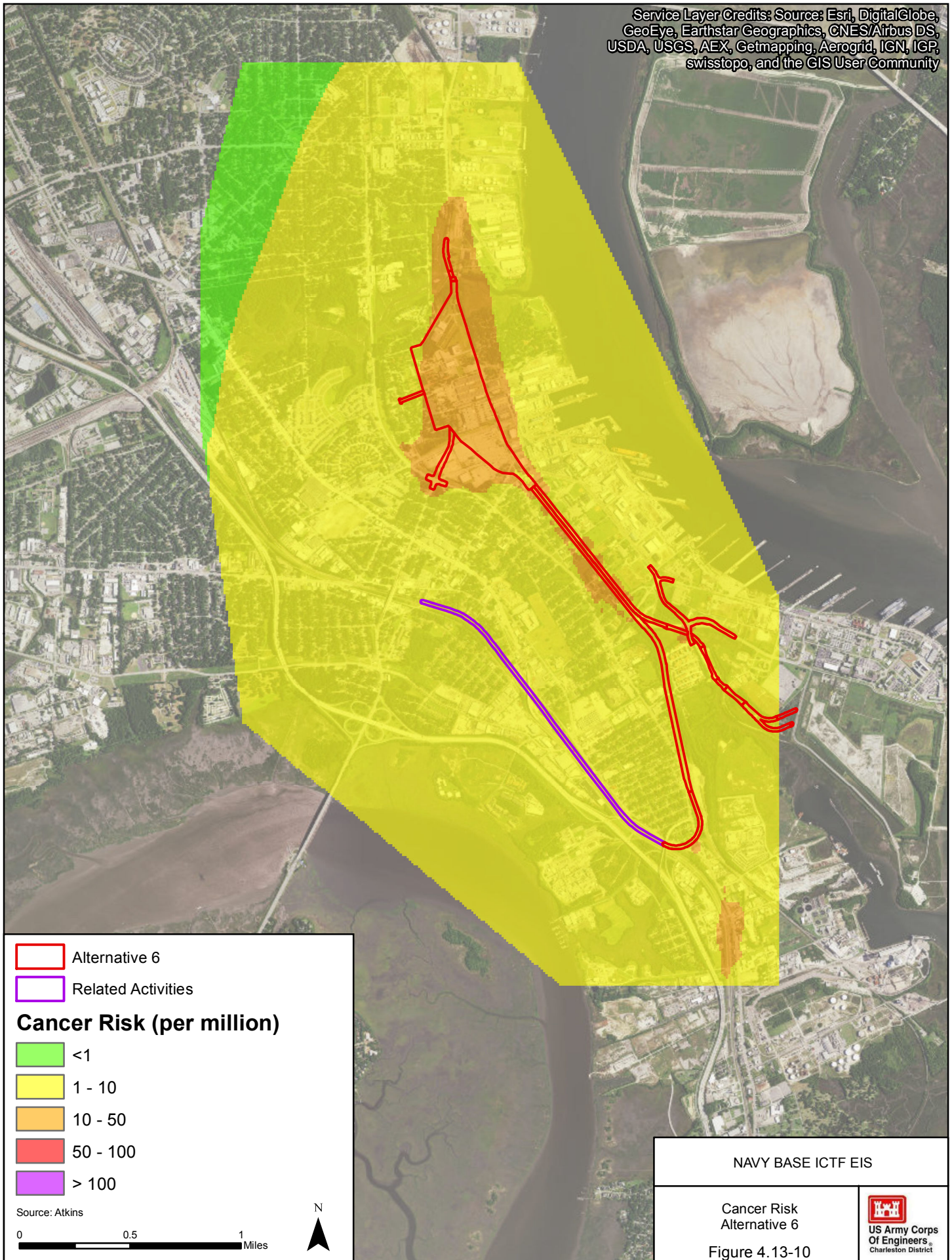
Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.01098	3.29	0.002	13.28%
Switch Rail	0.00116	0.35	0.0002	1.40%
UTR Truck Running	0.00125	0.38	0.0003	1.51%
UTR Truck Idling	0.01224	3.67	0.002	14.81%
OTR Truck Running	0.02448	7.34	0.005	29.62%
OTR Truck Idling	0.03255	9.77	0.007	39.38%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.08267</b>	<b>24.80</b>	<b>0.02</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015, USEPA 2004, 2015o.

The maximum potential cancer risk from Alternative 6 falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 6 would be acceptable. The maximum noncancer hazard for the Alternative 6 would be below 1. Impacts from Alternative 6 from noncancer hazard would be negligible.





### **4.13.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

#### **4.13.9.1 Construction Criteria Pollutant Emissions Inventory**

Under Alternative 7, a variation of Alternative 1 (Proposed Project) with the ICTF being moved to the River Center project site and NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. As such, construction of the rail and road alignments differs from Alternative 1 (Proposed Project), and so construction equipment exhaust GHG emissions are different to reflect the change in length of the rail connections and road segments. Haul truck activities, worker and vendor commute, architectural coating, asphalt paving, and material movement were assumed to be the same as Alternative 1 (Proposed Project). Demolition of buildings at the River Center project site would be the same for Alternative 7 as for Alternative 5. Total criteria pollutant emissions from construction of Alternative 7 are shown below in Table 4.13-33.

#### **4.13.9.2 Operational Criteria Pollutant Emissions Inventory**

Under Alternative 7, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 7 would be the same as the activity in Alternative 5. As such, criteria pollutant emissions from operational activities would be the same as Alternative 5 and impacts would be the same as Alternative 5.

#### **4.13.9.3 Criteria Pollutant Dispersion Modeling**

Under Alternative 7, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the private drayage road and the location of where the pollutants would be emitted due to the different rail track segments and site. Alternative 7 dispersion modeling outputs, ambient air monitoring levels, estimated SCPA Marine Container Terminal, and NAAQS compliance demonstration are included the Table 4.13-34 below. All dispersion modeling assumptions, calculations, and model outputs are included in Appendix I.

Impacts to Air Quality by Alternative 7 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project).



Table 4.13-33  
Total Construction Criteria Pollutant Emissions Inventory, Alternative 7

Activity	Criteria Pollutant (tons)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Construction Equipment Exhaust	159.6	368.6	23.5	22.8	0.6	38.8
Haul Truck Exhaust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Worker and Vendor Commute	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Architectural Coating	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Asphalt Paving	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Demolition	0	0	42.6	6.5	0	0
Surface Disturbance	0	0	2.9	3.6	0	0
Material Movement	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
On-Road Fugitive Dust	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
<b>Total</b>	<b>10,476.7</b>	<b>27,072.3</b>	<b>1,258.3</b>	<b>1,161.7</b>	<b>32.3</b>	<b>2,484.7</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: USEPA 2010, 2015d, FHWA 2011b, CAPCOA 2013.

Table 4.13-34  
Criteria Pollutant Dispersion Modeling, Alternative 7

Pollutant		Average Time	AERMOD Results	Ambient Background Level (Monitored)	SCPA Marine Container Terminal	Total Impact	NAAQS	NAAQS exceeded?
<b>Carbon Monoxide<sup>(1)</sup></b>		8-hour	0.055 ppm	0.3 ppm	0.14 ppm	0.495 ppm	9 ppm	No
		1-hour	0.082 ppm	0.6 ppm	0.504 ppm	1.187 ppm	35 ppm	No
<b>Nitrogen Dioxide</b>		1-hour	66.321 ppb	36 ppb	Not Modeled	102.321 ppb	100 ppb	<b>Yes</b>
		Annual	5.591 ppb	6.66 ppb	1.59 ppb	13.841 ppb	53 ppb	No
<b>Particle Pollution</b>	<b>PM<sub>2.5</sub></b>	Annual	0.108 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.314 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	No
		Annual	0.108 µg/m <sup>3</sup>	8.2 µg/m <sup>3</sup>	0.006 µg/m <sup>3</sup>	8.314 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	No
		24-hour	0.399 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	0.37 µg/m <sup>3</sup>	20.769 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	No
	<b>PM<sub>10</sub></b>	24-hour	0.477 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	6.00 µg/m <sup>3</sup>	48.447 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	No
<b>Sulfur Dioxide<sup>(2)</sup></b>		1-hour	0.140 ppb	16 ppb	Not Modeled	16.140 ppb	75 ppb	No
		3-hour	<0.001 ppm	0.016 ppm	0.057 ppm	0.073 ppm	0.5 ppm	No

Notes and Acronyms:

See Table 4.13-6.

Sources: SCDHEC 2015b, Lakes 2015, USEPA 2015o.

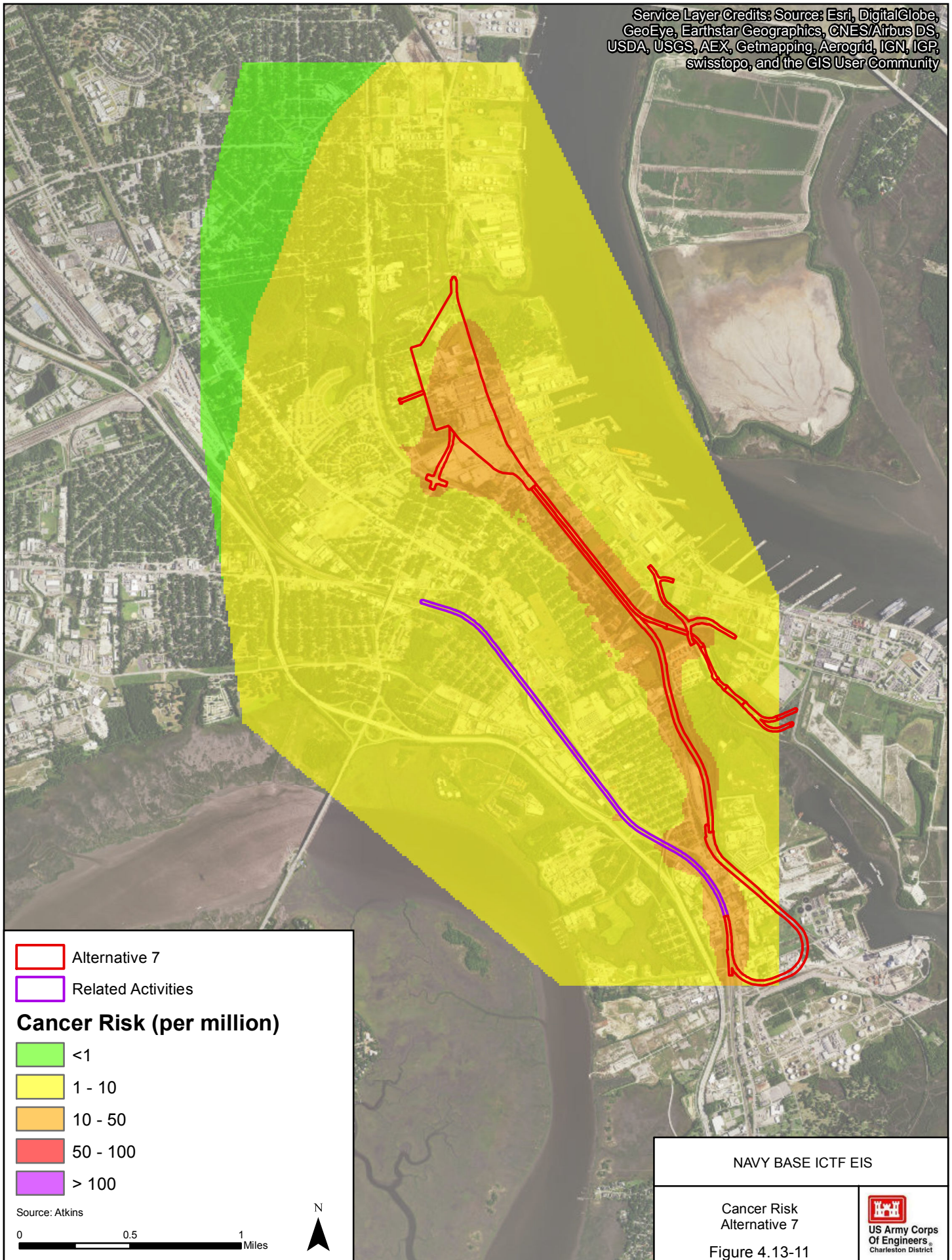
As shown in Table 4.13-34, criteria pollutants emitted from the operation of Alternative 7, along with the existing and projected criteria pollutants, would put exceed the NAAQS for 1-hour NO<sub>2</sub>; therefore, Alternative 7 would put the Tri-County area into non-attainment for NO<sub>2</sub>. Under full operation of Alternative 7, the Tri-County area would not remain in compliance with the NAAQS. Impacts to air quality from the operation of Alternative 7 on criteria pollutants would be major adverse.

#### 4.13.9.4 Hazardous Air Pollutants (HAPs)

Under Alternative 7, the Palmetto Railways Project would be operated as proposed with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 7 would be the same as the activity in Alternative 5. As such, HAPs emissions from operational activities would be the same as Alternative 5 and impacts would be the same as Alternative 5.

#### 4.13.9.5 Health Risk Assessment

An emission density map of the cancer risk of Alternative 7 is in Figure 4.13-11. This figure demonstrates the dispersion of DPM and corresponding health risk over the potentially exposed population. All dispersion modeling assumptions, inputs and outputs, and HRA calculations are included in Appendix I.





The maximum potential cancer risk is the highest estimated cancer risk at a residence for Alternative 2 and is analyzed to demonstrate the worst-case scenario. Contribution by source group is shown in Table 4.13-35. As shown in Table 4.13-35, OTR Truck idling is the largest source, contributing 39.38% of the highest estimated cancer risk. Emissions from OTR truck running are the second largest contributor, at 29.62%. The table also shows the maximum noncancer hazard.

Table 4.13-35  
Cancer Risk and Noncancer Hazard by Source Group, Alternative 7

Source Group	DPM Concentration ( $\mu\text{g}/\text{m}^3$ )	Cancer Risk (per million)	Noncancer Hazard	Source Group Contribution
Line Haul Rail	0.01002	3.01	0.002	12.26%
Switch Rail	0.00116	0.35	0.0002	1.42%
UTR Truck Running	0.00125	0.38	0.0003	1.53%
UTR Truck Idling	0.01224	3.67	0.002	14.98%
OTR Truck Running	0.02448	7.34	0.005	29.96%
OTR Truck Idling	0.03255	9.77	0.007	39.84%
Worker Commute	0.00000	0.00	0.000	0.00%
On-site Offroad Equipment	0.00000	0.00	0.000	0.00%
<b>Total</b>	<b>0.08170</b>	<b>24.51</b>	<b>0.02</b>	<b>100.00%</b>

Notes and Acronyms:

See Table 4.13-8.

Source: Lakes 2015; USEPA 2004, 2015o.

The maximum potential cancer risk from Alternative 7 falls between 1 per million and 100 per million, which is within the acceptable risk range. Impacts from the potential maximum cancer risk from Alternative 7 would be acceptable. The maximum noncancer hazard for the Alternative 7 would be below 1. Impacts from Alternative 7 from noncancer hazard would be negligible.

#### 4.13.10 Related Activities

If the Proposed Project was constructed, new track would be constructed on a section of out-of-service CSX ROW to accept intermodal trains at the proposed new at-grade crossing at Meeting Street. Construction would extend from the vicinity of Discher to Misroon Street. Existing track would be reactivated from Misroon Street into Ashley Junction as needed. This Related Activity would apply to Alternatives 1, 2, 4, 5, and 7. Under Alternatives 3 and 6, the Related Activity construction would be the same as Alternatives 1, 2, 4, 5, and 7; however construction of new track would begin at the proposed new at-grade crossing at Meeting Street in the vicinity of Kingsworth Avenue. Under Alternative 2 an additional Related Activity, reactivating an out-of-service ROW and constructing a new railroad bridge, would be required to connect the NS arrival/departure tracks lead track from

the ICTF across a portion of marsh which drains to Noisette Creek to the existing NCTC track along Virginia Avenue.

The criteria pollutant emissions from the construction and operation of the related activity were included in the construction and operational criteria pollutant emissions inventories for Alternatives 1-7, as well as the non-DPM HAPs emission inventories. The related activity was also included in the dispersion modeling of the NAAQS and DPM. Therefore, impacts from the construction and operation of the related activity are analyzed in this analysis.

#### 4.13.11 Summary of Impacts Table

Alternative	Impacts of the Criteria Pollutants on Air Quality			Impacts of HAPs on Air Quality	
	Construction Emissions	Operational Emissions	NAAQS Dispersion Modeling	Non-DPM HAPs	DPM
<b>No-Action</b>	The No-Action Alternative would result in short-term construction period criteria pollutant emissions. Potential impacts would be minor short-term adverse.	The No-Action Alternative operational criteria pollutant emissions would be less than 1 percent of study area's criteria pollutant emissions. Potential impacts would be minor permanent adverse.	Criteria pollutants emitted from the No-Action Alternative, along with the existing and projected criteria pollutants, would not put the Tri-County area into non-attainment for any criteria pollutants and the NAAQS would remain in compliance. Potential impacts would be minor permanent adverse.	Non-DPM HAP emissions from the No-Action Alternative would each equal less than one-tenth of 1 percent of the total HAPs emitted in the study area. Potential impacts would be acceptable.	Potential excess cancer risk would be within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Proposed Project construction criteria pollutant emissions would be short term and spread out over five years. Potential impacts to air quality would be minor short-term adverse.	Proposed Project Alternative operational criteria pollutant emissions would be less than 1 percent of study area's criteria pollutant emissions. Potential impacts would be minor permanent adverse.	Criteria pollutants emitted from the Proposed Project Alternative, along with the existing and projected criteria pollutants, would not put the Tri-County area into non-attainment for any criteria pollutants and the NAAQS would remain in compliance. Potential impacts would be minor permanent adverse.	Non-DPM HAP emissions from the Proposed Project Alternative would each equal less than one-tenth of 1 percent of the total HAPs emitted in the study area. Potential impacts would be acceptable.	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

Alternative	Impacts of the Criteria Pollutants on Air Quality			Impacts of HAPs on Air Quality	
	Construction Emissions	Operational Emissions	NAAQS Dispersion Modeling	Non-DPM HAPs	DPM
<b>2: CSX – Milford / NS – S-line</b>	Potential impacts would be similar to Alternative 1	Potential impacts would be the same as Alternative 1	Potential impacts would be the similar to Alternative 1	Potential impacts would be the same as Alternative 1	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.
<b>3: CSX – Kingsworth / NS – Hospital</b>	Potential impacts would be the similar to Alternative 1	Potential impacts would be the same as Alternative 1	Potential impacts would be similar to Alternative 1	Potential impacts would be the same as Alternative 1	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.
<b>4: CSX &amp; NS – Milford</b>	Potential impacts would be the similar to Alternative 1	Potential impacts would be the same as Alternative 1	Potential impacts would be similar to Alternative 1	Potential impacts would be the same as Alternative 1	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.



Alternative	Impacts of the Criteria Pollutants on Air Quality			Impacts of HAPs on Air Quality	
	Construction Emissions	Operational Emissions	NAAQS Dispersion Modeling	Non-DPM HAPs	DPM
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Potential impacts would be similar to Alternative 1.	Alternative 5 operational criteria pollutant emissions would be less than 1 percent of Study Area's criteria pollutant emissions. Potential impacts would be minor permanent adverse.	Criteria pollutants emitted from Alternative 5, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO <sub>2</sub> 1 hour NAAQS. Potential impacts would be major adverse.	Non-DPM HAP emissions from Alternative 5 would each equal less than one-tenth of 1 percent of the total HAPs emitted in the Study Area. Potential impacts would be acceptable.	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Potential impacts would be similar to Alternative 1	Potential impacts would be the same as Alternative 5	Criteria pollutants emitted from Alternative 6, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO <sub>2</sub> 1 hour NAAQS. Potential impacts would be major adverse.	Potential impacts would be the same as Alternative 5	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Potential impacts would be similar to Alternative 1	Potential impacts would be the same as Alternative 5	Criteria pollutants emitted from Alternative 7, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO <sub>2</sub> 1 hour NAAQS. Potential impacts would be major adverse.	Potential impacts would be the same as Alternative 5	Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

### 4.13.12 Mitigation

#### 4.13.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information

submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- \*Construct an earthen berm between the processing and classification tracks and adjacent neighborhoods. (Minimization)
- \*Comply with Air Quality State Construction and Operating permit requirements, conditions, and reporting. (Minimization)
- \*Operate and maintain air pollution control equipment in accordance with permit requirements. (Minimization)
- \*Implement dust control measures (such as watering unpaved work areas, temporary and permanent seeding and mulching, covering stockpiled materials, and using covered haul trucks) in accordance with the conditions set forth in the SCDHEC Air permit issued for the Proposed Project. (Minimization)
- Reduction of truck traffic on local roads by providing additional intermodal capacity. (Minimization)
- Use electric wide-span gantry cranes that emit zero air emissions versus diesel-powered lift equipment. (Minimization)
- Construct a semi-automated facility that minimize air quality emissions during operations as a result of increased efficiencies during the handling and processing of containers. (Minimization)
- Use Tier 4 Utility Truck Rigs (UTR) on the private drayage road to transfer containers to the ICTF versus transferring the same containers using over the road trucks on public roadways to minimize emissions. (Minimization)
- Limit switching activity within the ICTF to Tier 4 locomotive engines at full build-out. (Minimization)
- Utilize automated gate system for the over-the-road (OTR) trucks entering/exiting the facility from the Wando Welch and North Charleston Container Terminals and an OCR portal at the connection from the facility (drayage road) to the HLT to reduce onsite idle times of trucks to 7.5 minutes/truckload and UTR to 5 minutes/truckload. (Minimization)

These avoidance and minimization measures, except the items noted with an asterisk (\*), have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to Air Quality are also provided in Chapter 6.

#### **4.13.12.2 Additional Potential Mitigation Measures**

No additional mitigation measures have been recommended by the Corps.

## 4.14 CLIMATE CHANGE

### 4.14.1 Methods and Impact Definitions

Impacts on Climate Change by the Proposed Project and alternatives were evaluated by estimating the Greenhouse Gas (GHG) emissions associated with the construction and operation of the Proposed Project and alternatives. GHG emissions were evaluated for the full buildout year, 2038 to best represent the GHG emissions at full operating capacity. Accordingly, a 2038 GHG emissions inventory represents the GHG emissions for all operating years after 2038, and a conservative estimate for interim years between opening year, 2018, and full buildout.

Construction period GHG emissions inventories included emissions from construction equipment exhaust, haul truck trips for importing and exporting material, and worker and vendor commute to and from the construction sites. GHG emissions from each of these activities were quantified using the EPA Motor Vehicle Emissions Simulator (MOVES) model, EPA guidance, activity information provided by Palmetto Railways, and assumptions and other sources where necessary. All GHG emission calculations, assumptions, and model runs are included in the Air Quality and Climate Change Technical Memorandum (Appendix I).

Operational GHG emissions inventories included emissions from locomotive activity, Over-the-Road (OTR) truck trips and idling, Utility Tractor Rig (UTR) truck trips and idling, worker commute, and GHG emissions associated with electricity consumption, water use, wastewater, and solid waste generation. Locomotive GHG emissions were estimated for off-terminal line haul activity, on-terminal line haul activity, and switch locomotive activity. It is common for intermodal container transfer facilities to use off-road equipment such as forklifts and cranes in its operations. However, the Proposed Project and Alternatives would utilize electric equipment, including gantry cranes. Electric equipment does not directly emit GHGs; however GHG emissions are indirectly emitted at the source of electrical generation and are inherent in the use of electricity. This analysis of operational GHG emissions includes these indirect sources of GHG emissions in the GHG calculations for electricity consumption. The analysis incorporated emission reduction strategies built into the project. Emission reductions from these Project features were calculated where feasible as minimization. GHG emissions from each of the operational activities were quantified using the EPA Motor Vehicle Emissions Simulator (MOVES) model, EPA guidance, activity information provided by Palmetto Railways, and assumptions and other sources where necessary. All GHG emission calculations, assumptions, and model runs are included in Appendix I.

Individual GHGs have varying heat-trapping properties and atmospheric lifetimes. Table 4.14-1 identifies the CO<sub>2</sub> equivalent (CO<sub>2</sub>e) of basic GHGs. Each GHG is compared to CO<sub>2</sub> with respect to its ability to trap infrared radiation, its atmospheric lifetime, and its chemical structure. The CO<sub>2</sub>e is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent measure. For example, CH<sub>4</sub> is a GHG that is 25 times more potent than CO<sub>2</sub>; therefore,



one metric ton of CH<sub>4</sub> is equal to 25 metric tons CO<sub>2</sub>e. When direct calculation to metric tons of CO<sub>2</sub>e was not available, GWPs were used to convert calculated CH<sub>4</sub> and N<sub>2</sub>O emissions into CO<sub>2</sub>e.

Table 4.14-1  
Global Warming Potential (GWP) of GHGs

GHG	GWP
CO <sub>2</sub>	1
CH <sub>4</sub>	25
N <sub>2</sub> O	298

Source: IPCC 2007.

Impact criteria for GHGs has not been established by the EPA; however, the Council on Environmental Quality (CEQ) has provided a reference point of 25,000 metric tons (MT) of CO<sub>2</sub>e emitted annually below which a GHG emission quantitative analysis is not warranted (CEQ 2014).

Climate Change impacts are by nature, cumulative and long term. An individual project cannot generate enough GHG emissions to influence Global Climate Change. The Proposed Project and alternatives participates in this potential impact by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together create changes in the climate. In addition, once emitted GHG emissions persist in the atmosphere for decades or longer impacting the climate over the long term. Furthermore, according to the CEQ guidance, the ultimate determination of significance remains subject to agency practice for the consideration of context and intensity. As such, impacts by the Proposed Project and alternatives on Global Climate Change will be evaluated comparatively against each alternative with the consideration of context and intensity (Table 4.14-2).

Table 4.14-2  
Impact Definitions, Climate Change

Negligible	Minor	Major
Short-term and Long-term GHG emissions do not occur or are at negligible levels.	Short-term or Long-term GHG emissions may occur. Short-term GHG emissions help make long-term emissions more efficient. Long-term emissions are minimized or mitigated through improved efficiency.	Short or Long-term GHG emissions may occur. Long-term GHG emissions are considerable due to inefficient use of fuel and/or resources.

## 4.14.2 No-Action Alternative

Under the No-Action Alternative, application for DA permit would be denied; the Proposed Project would not occur; CSX and NS would undertake operational and structural modifications to Ashley Junction and 7-Mile rail yards and future use of the project site and River Center project site would likely be mixed-use and industrial (e.g., rail-served warehousing distribution center). As such, the site would need to be built for these uses and construction activities would occur. Other existing rail yards would facilitate the transfer of the additional containers by rail. CSX and NS would do so by increasing the length of existing trains to accommodate more containers per train. Additional trains and locomotive engines would not be used under the No-Action Alternative.

### 4.14.2.1 Impacts on Climate Change by the No-Action Alternative: Construction GHG Emissions Inventory

The No-Action Alternative would result in construction period GHG emissions. Construction period GHG emissions would be short term. Therefore, impacts to Global Climate Change resulting from the No-Action Alternative construction GHG emissions would be minor adverse.

### 4.14.2.2 Impacts on Climate Change by the No-Action Alternative: Operational GHG Emissions Inventory

There would be no increase in GHG emissions due to locomotive activity for the No-Action Alternative. It is assumed that the existing facility workers would be sufficient for the increase in container throughput; therefore, there are no increase in GHG emissions due to worker commute for the No-Action Alternative. Further, under the No-Action Alternative, the project site and River Center project site would not be constructed and operated, including the private drayage road. Therefore, it is assumed that additional UTR trucks would not be operated under the No-Action Alternative, and OTR trucks would be used to transport all additional containers from existing terminals to the CSX and NS facilities. Although CSX and NS would undertake operational and structural modifications to Ashley Junction and 7-Mile rail yards, it is assumed CSX and NS would not increase their facility's energy use, water use, wastewater and solid waste generation. Therefore, there are no increase in GHG emissions due to energy use, water use, wastewater and solid waste generation for the No-Action Alternative. It is common for intermodal container transfer facilities to use off-road equipment such as forklifts and cranes in its operations. However, CSX and NS crane and forklift activity was unavailable. Although it is reasonable to assume that some activity would take place, GHG emissions from on-site off-road equipment was not quantified.

Therefore, GHG emissions due to operational activities of the No-Action Alternative would include running emissions from OTR truck trips and idling emissions from idling on-site at the Ashley Junction and 7-Mile rail yards. An idle time of 15 minutes was assumed per truckload. The operational GHG emissions inventory for the No-Action Alternative is in Table 4.14-3 below.

Table 4.14-3  
Alternative Annual Operational GHG Emissions Inventory, No-Action Alternative

Activity	CO <sub>2</sub> e (MT)
Off-Terminal Line Haul Locomotive	0
On-Terminal Line Haul Locomotive	0
Switch Locomotive	0
UTR Truck Running	0
UTR Truck Idling	0
OTR Truck Running	34,773
OTR Truck Idling	1,287
Worker Commute	0
Electricity	0
Water	0
Wastewater	0
Solid Waste	0
On-site Offroad Equipment	0
<b>Total</b>	<b>36,060</b>
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>YES</b>

Source: IPCC 2007, USEPA 2014f.

Operation of the No-Action Alternative would generate annual GHG emissions above the CEQ reference point of 25,000 MT CO<sub>2</sub>e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-3 above summarizes operational phase emissions, which provides a review of long-term effects. The long-term effect of the operational phase of the No-Action Alternative is an inefficient movement of goods movement between the Port and the destination of the goods. This is due to the extensive use of OTR trucks to facilitate the movement of goods, compared to the increased use of rail and UTR trucks on the private drayage road in Alternatives 1-7. This is also due to the longer truck idling time (15 minutes) assumed for the No-Action Alternative in comparison to the shorter idle time (7.5 minutes) that would be expected under Proposed Project and alternatives which would include an automated gate system for OTR trucks entering and exiting the facility. As demonstrated in the following sections, the No-Action Alternative has a higher annual operational GHG emissions inventory than Alternatives 1-7. This comparison is important when considering the context and intensity of the impacts. Due to the higher annual operational GHG emissions inventory from the inefficient use of resources, the No-Action Alternative's long-term effects on Global Climate Change would be more severe than those in Alternatives 1-7. Because of this, impacts of the long-term effects on Global Climate Change from the No-Action Alternative are major adverse. Short-term and long-term effects of the Proposed Project and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.



#### 4.14.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Under Alternative 1, the Proposed Project would be constructed. As such, GHG emissions from construction activities including operation of construction equipment, haul truck trips for the import and export of material, and commutes by construction workers and vendors would occur. GHG emissions from operational activities including operation of locomotives, UTR trucks, OTR trucks, and commutes by workers would also occur, as well as GHG emissions associated with electricity use, water use, wastewater, and solid waste.

##### 4.14.3.1 Impacts on Climate Change by the Proposed Project: Construction GHG Emissions Inventory

Total GHG emissions from construction are shown below in Table 4.14-4.

Table 4.14-4  
Total Construction GHG Emissions Inventory, Alternative 1

Activity	Total CO <sub>2</sub> e (MT)
Construction Equipment Exhaust	90,624
Haul Truck Exhaust	2,631
Worker and Vendor Commute	1,361
<b>Total</b>	<b>94,616</b>
<b>Annual Average</b>	<b>18,923</b>
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007; USEPA 2010, 2014f, 2014b; FHWA 2011b; CAPCOA 2013.

Construction of the Proposed Project would generate annual GHG emissions below the CEQ reference point of 25,000 MT CO<sub>2</sub>e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-4 above summarizes construction phase emissions, which provides a review of short-term effects. The long-term benefit of the construction phase is that the rail and roadway infrastructure would be built to facilitate an efficient goods movement between the Port of Charleston facilities and the destination of the goods. The construction phase provides much of the infrastructure improvements needed to facilitate an efficient goods movement. Because the GHG emissions from the construction phase are short-term in nature and provide the needed infrastructure for the increased efficiency in the transport of goods, the impacts from the construction GHG emissions on Global Climate Change would be minor adverse. The long-term effects of the Proposed Project on Global Climate Change are analyzed in section 4.14.3.2. Short-term and long-term effects of the

Proposed Project and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

#### 4.14.3.2 Impacts on Climate Change by the Proposed Project: Operational GHG Emissions Inventory

Total GHG emissions from operation are shown below in Table 4.14-5.

Table 4.14-5  
Annual Operational GHG Emissions Inventory, Alternative 1 (Proposed Alternative)

Activity	CO <sub>2</sub> e (MT)
On-Terminal Line Haul Locomotive	6,127
Off-Terminal Line Haul Locomotive	5,361
Switch Locomotive	2,612
UTR Truck Running	1,261
UTR Truck Idling	1,051
OTR Truck Running	12,751
OTR Truck Idling	1,051
Worker Commute	727
Electricity <sup>(1)</sup>	4
Water	<1
Wastewater	<1
Solid Waste	4
<b>Total</b>	<b>30,948</b>
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>YES</b>

Notes: It is common for intermodal facilities to operate on-site offroad equipment such as gantry cranes. The Navy Base ICTF would operate electric gantry cranes. As such, GHG emissions associated with on-site offroad equipment are included in the GHG emissions associated with electricity consumption.

Source: IPCC 2007, USEPA 2014f, 2014b, 2014c.

Operation of the Proposed Project would generate annual GHG emissions above the CEQ reference point of 25,000 MT CO<sub>2</sub>e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-5 above summarizes operational phase emissions, which provides a review of long-term effects. The long-term benefit of the operational phase of the Proposed Project would be the facilitation and efficient goods movement between the Port and the destination of the goods. The Proposed Project operations provide the improvements needed to facilitate an efficient goods movement through its additional use of rail and UTR trucks. The use of the UTR trucks on the private drayage road takes many OTR trucks off of public roadways compared to the No-Action Alternative.

The use of the private drayage road also shortens the length of the trips taken by the UTR trucks, reducing the running emissions of diesel trucks during operation. The Proposed Project also includes minimization measures, outlined in section 4.14.12.1, that the No-Action Alternative does not. These include limiting OTR idle time to 7.5 minutes per truckload and UTR idling time to 5 minutes per truckload through the utilization of an automated gate system for the OTR and UTR trucks. These minimization measures also include using Tier 4 UTR trucks and Tier 4 Switch locomotive engines. These minimization measures, along with the design of the Proposed Project increase the efficiency of its operations. Although the Proposed Project's annual operational GHG emissions inventory exceeds the CEQ reference point, it is lower than the No-Action Alternative operations inventory and Alternatives 5-7 operational inventories, as shown in sections 4.14.7 through 4.14.9. This comparison is important when considering the context and intensity of the impacts. Due to the lower annual operational GHG emissions inventory, the Proposed Project's long-term effects on Global Climate Change would be less severe than those in the No-Action Alternative and Alternatives 5-7. Because of this, impacts of the long-term effects on Global Climate Change from the Proposed are minor adverse. Short-term and long-term effects of the Proposed Project and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

#### **4.14.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

Under Alternative 2, the Palmetto Railways Project would be constructed as a variation of the Proposed Project. Alternative 2 differs from the Proposed Project on where the northern rail connection for NS would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the NS northern rail connection alignment. As such, construction of the rail alignments differs slightly from the Proposed Project. Construction equipment exhaust GHG emissions are different to reflect the change in length of the NS northern rail connection. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. Alternative 2 would be operated as proposed.

##### **4.14.4.1      Impacts on Climate Change by Alternative 2: Construction GHG Emissions Inventory**

Total GHG emissions from construction of Alternative 2 are shown below in Table 4.14-6. Impacts to Global Climate Change by Alternative 2 construction GHG emissions would be the same as the Proposed Project.



Table 4.14-6  
Total Construction GHG Emissions Inventory, Alternative 2

Activity	Total CO <sub>2</sub> e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	91,935	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
<b>Total</b>	<b>95,927</b>	Greater than Proposed Project
<b>Annual Average</b>	<b>19,185</b>	Greater than Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, USEPA 2014f, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

#### 4.14.4.2 Impacts on Climate Change by Alternative 2: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as the Proposed Project. Impacts would be the same as the Proposed Project.

#### 4.14.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital)

Under Alternative 3, the Palmetto Railways Project would be constructed as a variation of the Proposed Project. Alternative 3 differs from the Proposed Project on where the southern rail connection for CSX would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the CSX southern rail connection alignments. As such, construction of the rail alignments differs slightly from the Proposed Project. Construction equipment exhaust GHG emissions are different to reflect the change in length of the CSX southern rail connection. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. Alternative 3 would be operated as proposed.

##### 4.14.5.1 Impacts on Climate Change by Alternative 3: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 3 are shown below in Table 4.14-7. Impacts to Global Climate Change by Alternative 3 construction GHG emissions would be the same as the Proposed Project.

Table 4.14-7  
Total Construction GHG Emissions Inventory, Alternative 3

Activity	Total CO <sub>2</sub> e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	86,808	Less than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
<b>Total</b>	<b>90,800</b>	Less than Proposed Project
<b>Annual Average</b>	<b>18,160</b>	Less than Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, USEPA 2014f, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

#### 4.14.5.2 Impacts on Climate Change by Alternative 3: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as the Proposed Project. Impacts would be the same as the Proposed Project.

#### 4.14.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

Under Alternative 4, the Palmetto Railways Project would be constructed as a variation of the Proposed Project. Alternative 4 differs from the Proposed Project in that NS and CSX would both enter and exit the Navy Base ICTF from a southern rail connection. As such, construction of the rail alignments differs from the Proposed Project. Construction equipment exhaust GHG emissions are different to reflect the change in length of the NS southern rail connection. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. Alternative 4 would be operated as proposed.

##### 4.14.6.1 Impacts on Climate Change by Alternative 4: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 4 are shown below in Table 4.14-8. Impacts to Global Climate Change by Alternative 4 construction GHG emissions would be the same as the Proposed Project.

Table 4.14-8  
Total Construction GHG Emissions Inventory, Alternative 4

Activity	Total CO <sub>2</sub> e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	85,943	Less than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
<b>Total</b>	<b>89,935</b>	Less than Proposed Project
<b>Annual Average</b>	<b>17,987</b>	Less than Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, USEPA 2014a, 2010, FHWA 2011, CAPCOA 2013.

#### 4.14.6.2 Impacts on Climate Change by Alternative 4: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as the Proposed Project. Impacts would be the same as the Proposed Project.

#### 4.14.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

Alternative 5 would be variation of the Proposed Project with the ICTF being moved to the River Center project site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the alternative site. As such, construction of the rail and road alignments differs from the Proposed Project. Construction equipment exhaust GHG emissions are different to reflect the change in length of the rail connections and road segments. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. Alternative 5 would be operated as proposed with the exception of UTR truck activity on the drayage road. The private drayage road in Alternative 5 is 2 miles long, which is twice the distance of the private drayage road in the Proposed Project. To maintain the daily container throughput, twice as many UTR trucks at the same rate of daily truckloads would be required for operating Alternative 5 compared to the Proposed Project.

##### 4.14.7.1 Impacts on Climate Change by Alternative 5: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 5 are shown below in Table 4.14-9.



Table 4.14-9  
Total Construction GHG Emissions Inventory, Alternative 5

Activity	Total CO <sub>2</sub> e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	99,512	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
<b>Total</b>	<b>103,504</b>	Greater than Proposed Project
<b>Annual Average</b>	<b>20,701</b>	Greater than Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, USEPA 2014f, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

Construction of Alternative 5 would generate annual GHG emissions below the CEQ reference point of 25,000 MT CO<sub>2</sub>e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-9 above summarizes construction phase emissions, which provides a review of short-term effects. The long-term benefit of the construction phase is that the rail and roadway infrastructure would be built to facilitate an efficient goods movement between the Port of Charleston facilities and the destination of the goods. The construction phase provides much of the infrastructure improvements needed to facilitate an efficient goods movement. Because the GHG emissions from the construction phase are short-term in nature and provide the needed infrastructure for the increased efficiency in the transport of goods, the impacts from the construction GHG emissions on Global Climate Change would be minor adverse. The long-term effects of Alternative 5 on Global Climate Change are analyzed in section 4.14.7.2. Short-term and long-term effects of the Proposed Project and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

#### 4.14.7.2 Impacts on Climate Change by Alternative 5: Operational GHG Emissions Inventory

GHG emissions from operational activities besides UTR truck running emissions would be the same as the Proposed Project. Alternative 5 would have twice as many GHG emissions from UTR truck running as the Proposed Project. Total GHG emissions from operation are shown below in Table 4.14-10.

Table 4.14-10  
Annual Operational GHG Emissions Inventory, Alternative 5

Activity	CO <sub>2</sub> e (MT)	Comparison to Proposed Project
On-Terminal Line Haul Locomotive	6,127	Same as Proposed Project
Off-Terminal Line Haul Locomotive	5,361	Same as Proposed Project
Switch Locomotive	2,612	Same as Proposed Project
UTR Truck Running	2,522	Greater then Proposed Project
UTR Truck Idling	1,051	Same as Proposed Project
OTR Truck Running	12,751	Same as Proposed Project
OTR Truck Idling	1,051	Same as Proposed Project
Worker Commute	727	Same as Proposed Project
Electricity <sup>(1)</sup>	4	Same as Proposed Project
Water	<1	Same as Proposed Project
Wastewater	<1	Same as Proposed Project
Solid Waste	4	Same as Proposed Project
<b>Total</b>	<b>32,208</b>	Greater then Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>YES</b>	-

Notes: It is common for intermodal facilities to operate on-site offroad equipment such as gantry cranes. The Navy Base ICTF would operate electric gantry cranes. As such, GHG emissions associated with on-site offroad equipment are included in the GHG emissions associated with electricity consumption.

Source: IPCC 2007, USEPA 2014f, 2014b, 2014g, 2009a, 2009b, 2008, SCPA 2013, USDOE 2011, AirProducts 2016, ICBE 2000.

Operation of Alternative 5 would generate annual GHG emissions above the CEQ reference point of 25,000 MT CO<sub>2</sub>e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-10 above summarizes operational phase emissions, which provides a review of long-term effects. The long-term benefit of the operational phase of Alternative 5 would be the similar to the Alternatives 1-4. Both the Alternative 5 and Alternatives 1-4 operations provide the improvements needed to facilitate an efficient goods movement through its additional use of rail and UTR trucks, along with the minimization measures listed in section 4.14.12. The variation for Alternative 5 is the use of the UTR trucks on the longer private drayage road. It takes many OTR trucks off of public roadways compared to the No-Action Alternative, however the doubled length of the drayage road compared to Alternatives 1-4 makes Alternative 5 slightly less efficient.

Although the Alternative 5 annual operational GHG emissions inventory exceeds the CEQ reference point, it is lower than the No-Action Alternative operations inventory and slightly higher than Alternatives 1-4 operational inventories, as shown in section 4.14.3. This comparison is important when considering the context and intensity of the impacts. Due to the lower annual operational GHG

emissions inventory than the No-Action Alternative, the Alternative 5 long-term effects on Global Climate Change would be less severe than those in the No-Action Alternative. And although the Alternative 5 annual operational GHG emissions inventory is slightly higher than the Alternatives 1–4 inventories, its long-term effects would likely be very similar. Because of this, impacts of the long-term effects on Global Climate Change from Alternative 5 are minor adverse. Short-term and long-term effects of the Proposed Project and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

#### 4.14.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital)

Alternative 6 would be a variation of the Proposed Project with the ICTF being moved to the River Center project site and the southern rail connection for CSX would connect to an existing CSX rail line in the vicinity of Kingsworth Avenue. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the alternative site. As such, construction of the rail and road alignments differs from the Proposed Project. Construction equipment exhaust GHG emissions are different to reflect the change in length of the rail connections and road segments. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. Alternative 6 would be operated as proposed with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 6 would be the same as the activity in Alternative 5.

##### 4.14.8.1 Impacts on Climate Change by Alternative 6: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 6 are shown below in Table 4.14-11. Impacts to Global Climate Change by Alternative 6 construction GHG emissions would be the same as Alternative 5.

Table 4.14-11  
Total Construction GHG Emissions Inventory, Alternative 6

Activity	Total CO <sub>2</sub> e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	94,710	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
<b>Total</b>	<b>98,702</b>	Greater than Proposed Project
<b>Annual Average</b>	<b>19,740</b>	Greater than Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, USEPA 2014a, 2014b, 2010, FHWA 2011b, CAPCOA 2013.



#### 4.14.8.2 Impacts on Climate Change by Alternative 6: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as Alternative 5. Impacts would be the same as Alternative 5.

#### 4.14.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)

Alternative 7 would be a variation of the Proposed Project with the ICTF being moved to the River Center project site and NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the alternative site. As such, construction of the rail and road alignments differs from the Proposed Project. Alternative 7 would be operated as proposed with the exception of UTR truck activity on the drayage road. Construction equipment exhaust GHG emissions are different to reflect the change in length of the rail connections and road segments. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. The UTR truck activity in Alternative 7 would be the same as the activity in Alternative 5.

##### 4.14.9.1 Impacts on Climate Change by Alternative 7: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 7 are shown below in Table 4.14-12. Impacts to Global Climate Change by Alternative 7 construction GHG emissions would be the same as Alternative 5.

Table 4.14-12  
Total Construction GHG Emissions Inventory, Alternative 7

Activity	Total CO <sub>2</sub> e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	96,977	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
<b>Total</b>	<b>100,969</b>	Greater than Proposed Project
<b>Annual Average</b>	<b>20,194</b>	Greater than Proposed Project
<b>Exceed 25,000 MT CO<sub>2</sub>e?</b>	<b>No</b>	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, USEPA 2014a, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

#### 4.14.9.2 Impacts on Climate Change by Alternative 7: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as Alternative 5. Impacts would be the same as Alternative 5.

#### 4.14.10 Related Activities

If the Proposed Project was constructed, new track would be constructed on a section of out-of-service CSX ROW to accept intermodal trains at the proposed new at-grade crossing at Meeting Street. Construction would extend from the vicinity of Discher Street to Misroon Street. Existing track would be reactivated from Misroon Street into Ashley Junction as needed. This Related Activity would apply to Alternatives 1, 2, 4, 5, and 7. Under Alternatives 3 and 6, the Related Activity construction would be the same as Alternatives 1, 2, 4, 5, and 7; however construction of new track would begin at the proposed new at-grade crossing at Meeting Street in the vicinity of Kingsworth Avenue. Under Alternative 2 an additional Related Activity, reactivating an out-of-service ROW and constructing a new railroad bridge, would be required to connect the NS arrival/departure tracks from the ICTF across a portion of marsh which drains to Noisette Creek to the existing NCTC track along Virginia Avenue.

The GHG emissions from the construction and operation of the related activity were included in the construction and operational GHG emissions inventories for Alternatives 1-7. Therefore, impacts from the construction and operation of the related activity are analyzed in section 4.14.3-9.

### 4.14.11 Summary of Impacts Table

Table 4.14-13  
Summary of Impacts, Climate Change

Alternative	Impacts of the Alternatives on Climate Change	
	Construction Emissions	Operational Emissions
<b>No-Action</b>	The No-Action Alternative result in short term construction period greenhouse gas (GHG) emissions and potential short-term impacts would be minor adverse.	Annual Operational GHG Emissions Inventory would be 36,060 MT CO <sub>2</sub> e. The No-Action Alternative would be the least efficient. Long-term effects would be major adverse.
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Because the GHG emissions from the construction phase provide the needed infrastructure for the increased efficiency in the transport of goods, the short-term impacts would be minor adverse.	Annual Operational GHG Emissions Inventory would be 30,948 MT CO <sub>2</sub> e. The Proposed Project would be the most efficient. Long-term effects would be minor adverse.
<b>2: CSX – Milford / NS – S-line</b>	Same as Alternative 1	Same as Alternative 1
<b>3: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 1	Same as Alternative 1
<b>4: CSX &amp; NS – Milford</b>	Same as Alternative 1	Same as Alternative 1
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Because the GHG emissions from the construction phase provide the needed infrastructure for the increased efficiency in the transport of goods, the short-term impacts would be minor adverse.	Annual Operational GHG Emissions Inventory would be 32,208 MT CO <sub>2</sub> e. Alternative 5 would be more efficient than the No-Action Alternative and nearly as efficient as the Proposed Project. Long-term effects would be minor adverse.
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Same as Alternative 5	Same as Alternative 5
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Same as Alternative 5	Same as Alternative 5

### 4.14.12 Mitigation

#### 4.14.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant's measures to avoid and minimize potential impacts of Alternative 1 (Proposed Project) are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact, or one that minimizes an impact.



See measures in Section 4.13, Air Quality. These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to Climate Change is also provided in Chapter 6.

#### **4.14.12.2 Additional Potential Mitigation Measures**

No additional mitigation measures have been recommended by the Corps.

## 4.15 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

### 4.15.1 Methods and Impact Definitions

The analysis and evaluation of potential HTRW impacts has been conducted using both qualitative and quantitative methods. These methods include literature reviews, presence/absence determinations of known contaminated areas within the study area (through the preparation of Phase 1 and/or Phase 2 ESAs and similar site evaluations), GIS, and professional judgment. The analysis also evaluates and determines the potential for the generation of new HTRW impacts associated with the construction and/or operation of the Navy Base ICTF, including but not limited to the potential processing and handling of HTRW materials in cargo containers and potential use of new ASTs and/or USTs for petroleum and other substances of concern.

The impact definitions are provided in Table 4.15-1.

Table 4.15-1  
Impact Definitions, Hazardous, Toxic, and Radioactive Waste

Negligible	Minor	Major
<p>Negligible (or no) involvement with contaminated soil, contaminated groundwater, or disturbance of existing hazardous materials/wastes. No existing structures would be demolished or require major renovations, so no involvement with asbestos or metals-based paints would occur.</p> <p>No potential for accidental spills and/or operational activities that contain HTRW materials.</p>	<p>Ground disturbance in areas designated as active SWMUs/AOCs, or in LUCs that require permitting with the U.S. Navy.</p> <p>Surficial impact to a Superfund (NPL-listed) site</p> <p>Existing groundwater monitoring wells may require removal and replacement.</p> <p>Demolition of structures that contain asbestos or metals-based paints.</p> <p>Accidental spills may occur on occasion, and clean-up programs prevent creation of a new HTRW site.</p>	<p>Accidental spills and/or construction/operation activities that result in soil or groundwater contamination that requires designation of a new area as an HTRW site, that contaminates surface waters at a reportable level requiring cleanup, and/or that requires future monitoring activities.</p> <p>Construction activities involving major disturbances to a Superfund (NPL-listed) site.</p>

### 4.15.2 No-Action Alternative

Under the No-Action Alternative, the Navy Base ICTF and River Center ICTF sites would be developed with land uses consistent with their zoning designations (M-1/M-2 and PDD, respectively). Significant portions of the former CNC are subject to a RCRA Hazardous Waste Permit (SC0 170 022 560), issued to the Navy by the SCDHEC. As part of any potential future development activities, there would be the potential for actions occurring within active SWMUs/AOCs and LUCs, which would be subject to the Navy's permitting process consistent with the Navy's document "*Process to Conduct*

*Construction Activities in areas under Land Use Controls at the Charleston Naval Complex, Revision 3*" dated April 2007 (Process Document), as well as compliance with the existing SCDHEC VCC related to Parcels 11, 12, 13A, and 14B. The Process Document requires submittal and approval of a "Charleston Naval Complex LUC Area Construction Permit." The permits are intended to ensure: 1) proper protection of workers and the public, 2) reporting of discovery of any unknown contamination, 3) management of excess soil and groundwater, and 4) posting and use of on-site safety information. As part of the VCC, Palmetto Railways is required to comply with the Navy's permitting requirements for areas to be developed as part of the Proposed Project.

Special precautions are required to be used when excavating or dewatering during construction projects in areas that have LUCs and are part of the VCC. Excavation within these areas would need to be monitored, and water effluent treated as appropriate, to ensure that no new contamination may impact groundwater and/or surface waters, and to ensure that workers were properly protected from the presence of HTRW contaminants. Counter-pumping of groundwater using well points may be required to prevent adverse migration of any groundwater contaminant plumes encountered during construction activities. There is the potential for both minor adverse and major adverse impacts; however, compliance with permitting requirements, and use of BMPs and spill prevention programs would minimize the potential for adverse impacts.

Development activities may require the removal of existing groundwater monitoring wells, and any affected wells would need to be relocated in order for the Navy to continue its monitoring program and reporting obligations. Future development activities may also require the demolition of structures that have been identified to contain, or would need to be tested for, asbestos and metals-based paints. Prior to demolition activities, projects would need to comply with all asbestos and metals-based paint testing, abatement, and worker protection requirements such as the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations.

Lastly, businesses may store fuel on-site and store/use minor quantities of hazardous materials, such as lead batteries and cleaning solvents, and as a result, there is the potential for accidental spills of hazardous materials under the No-Action Alternative. Any potential ASTs and USTs would be provided with secondary containment in compliance with SCHDEC regulations, and the hazardous materials would be stored properly in compliance with RCRA, to minimize the potential for minor and/or major adverse impacts.

#### **4.15.3      Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)**

The project site contains large areas that are subject to LUCs and are constrained by the VCC entered into between Palmetto Railways and SCDHEC. Construction of the Proposed Project must comply with the LUCs and with the VCC. The parcels of land making up the project site, along with the adjacent parcels needed for railroad/road improvements (not including the Southern Alternatives



area), include approximately eight contaminated sites that are undergoing active monitoring. Five sites were also identified with contamination concerns that warranted further investigations. In addition, the proposed development of rail infrastructure for the CSX arrival/departure tracks (e.g., the Southern Alternatives Area) may impact an additional 14 sites that have a high risk of contamination involvement. Due to the proposed railway construction in the Hospital District, there would be an additional impact to the active groundwater monitoring site near Noisette Creek, which may include wells that would need to be relocated. Accordingly, there would be a concern about properly monitoring and addressing contaminated soil and dewatering effluent disposal.

The number of buildings (with the potential to contain asbestos or metals-based paints) within the ICTF site is approximately 43. In addition to the site itself, a further 57 structures would need to be removed to accommodate construction of the noise berm. An additional approximately 20 buildings may need to be removed to accommodate the railway improvements to the south of the ICTF, and another approximately 15 -30 structures would need to be removed to build the NS line through the Hospital District. This analysis assumes all of these buildings outside of the ICTF site have the potential to contain asbestos and/or metals-based paints.

It is anticipated that a certain (relatively low) number of containers coming into the Navy Base ICTF would contain hazardous materials. As discussed in the FEIS for the Proposed Marine Container Terminal at the CNC (Corps 2006), and as documented by the South Carolina State Ports Authority, the number of containers with hazardous materials coming into the Port terminals typically did not exceed 5 percent. Accordingly, it is estimated that approximately 5 percent of containers handled by the Navy Base ICTF would contain hazardous materials. The types of hazardous materials that could transit through the ICTF would be required to comply with all applicable regulations governing the identification, handling, and transport of hazardous materials.

#### **4.15.3.1 Construction**

Alternative 1 (Proposed Project) would require soil excavation to construct or rebuild roadways and railways and to construct facilities (such as buildings, work yards, and railyards, etc.) within the project. These excavation activities may result in involvement with contaminated soils. The project areas have been subject to numerous and extensive environmental studies and assessments; thus the potential for the project to encounter large quantities of previously-unknown buried or stored hazardous materials or hazardous wastes is considered unlikely. The Navy permitting process requires stoppage of work if discovery of unknown contamination occurs. As with other construction projects involving contaminated soils, the soils impacted by Alternative 1 (Proposed Project) would require testing and proper disposal at an approved facility (if they exceed given regulatory thresholds).

For areas of deeper excavations, such as installation of stormwater infrastructure (the 4 dry detention ponds), foundation footers, roadway and rail pilings, and other deeper excavations,

contaminated groundwater may be encountered, which would require permitting, treatment, and proper disposal of the dewatering effluent. Provisions for addressing groundwater use restrictions and proper disposal of dewatering effluent are included in the “Charleston Naval Complex LUC Area Construction Permit” process described under the No-Action Alternative. Treatment of the dewatering effluent may be required prior to any discharge to surface water or stormwater systems, and counter-pumping may be required to prevent the migration of contaminated groundwater into uncontaminated areas. The potential for the Alternative 1 (Proposed Project) to have involvement with contaminated groundwater is probable; however avoidance and minimization measures (such as avoiding excavation activities in known active sites and adherence to the Navy permitting process) would help to keep potential impacts to a minimum adverse impact. Counter-pumping of groundwater, using well points, would be performed as necessary to prevent the migration of existing groundwater contaminant plumes. The Navy is currently conducting periodic groundwater monitoring at AOCs 569, 570, and 578, which would be impacted by the railroad infrastructure planned immediately northwest of the project site. Affected groundwater monitoring wells may need to be relocated.

For those buildings and other structures that would require demolition or significant renovations, asbestos and lead paint surveys would be required. Any structures confirmed to contain asbestos and/or lead-based paint would need to be addressed according to NESHAP regulations prior to their renovation/demolition. Palmetto Railways may minimize the number of structures to be demolished in its design of the Navy Base ICTF; however, the aerial extent of the facility and the number of structures that would require demolition would not eliminate the need for demolition, nor avoid the potential interaction with structures that can contain asbestos and/or metals-based paints. Demolition of structures and remediation activities would be considered a minor short-term adverse impact.

Similar to the No-Action Alternative, there is the potential for accidental spills during construction activities; however, use of BMPs and Spill Prevention Programs can minimize the adverse impact from these occurrences.

The project site should have minimal involvement with the Macalloy Corporation Superfund Site. Other infrastructure, such as the future, approved Port Access Road, is planned for the Macalloy Corporation Superfund Site, but that work is not considered part of the Proposed Project.

#### **4.15.3.2      Operation**

Under Alternative 1 (Proposed Project), there would be limited potential for operational activities that could impact HTRW above and beyond those discussed under construction activities. It is assumed that Palmetto Railways would use ASTs to store diesel fuel for the yard trucks, and as a result, there is the potential for localized, minor spills of petroleum; however, implementation of a spill prevention program, and placement of appropriate clean-up materials nearby would minimize

any adverse spill. The presence of containers with hazardous materials may also result in accidental spills from handling or derailment, and the potential exists for minor and major adverse impacts from such an occurrence. Use of BMPs, implementation of a Spill Prevention Program, involvement of emergency response (Hazmat) personnel, and compliance with all Federal, state, and local spill control and response regulations in such circumstances would help mitigate the adverse impact. Increased vehicular and rail traffic would likely contribute PAHs (e.g., grease from train and truck wheel bearings) and metals (e.g., from wearing of brake pads) to the nearby soil, and ultimately to the groundwater.

#### **4.15.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

The footprint of the areas impacted by Alternative 2 is comparable to the footprint of those areas for Alternative 1 (Proposed Project), with the significant exception that the NS rail line would connect to an existing railroad corridor (along Spruill Avenue) to the west of the Hospital District. Impacts to the Hospital District, as they related to HTRW, would essentially be avoided, as discussed below.

##### **4.15.4.1      Construction**

The environmental consequences of construction of the Navy Base ICTF under Alternative 2 would be similar to Alternative 1 (Proposed Project) with the following exceptions due to avoidance of the Hospital District:

- Involvement with the groundwater monitoring site located near Noisette Creek would be avoided.
- The need to remove approximately 15–30 structures to accommodate the NS line through the Hospital District would be avoided, resulting in less potential need for testing and/or abatement of asbestos and metals-based paints associated with these structures.

##### **4.15.4.2      Operation**

The environmental consequences of operation of the Navy Base ICTF under Alternative 2 would be similar to those discussed under the Proposed Project.

#### **4.15.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

The footprint of the areas impacted by Alternative 3 is comparable to the footprint of those areas for Alternative 1 (Proposed Project), with the significant exception that the CSX rail line leading south from the project would connect with an existing railroad corridor in the area along Spruill Avenue, but north of Kingsworth Avenue. Impacts to the commercial and industrial areas south of Kingsworth



Avenue, to as far south as Milford Street (i.e., the bulk of the Southern Alternatives Area), would essentially be avoided, as discussed below.

#### **4.15.5.1 Construction**

The environmental consequences of construction of the Navy Base ICTF under Alternative 3 would be similar to Alternative 1 (Proposed Project), with the following exceptions due to avoidance of the area south of Kingsworth Avenue:

- This alternative would affect only two of the 14 sites in the Southern Alternatives Area that pose a high risk of contamination involvement.
- The need to remove approximately 20 structures to accommodate the CSX line through the area south of Kingsworth Avenue would be avoided, resulting in less potential need for testing and/or abatement of asbestos and metals-based paints associated with these structures.
- Alternative 3 would involve the removal of approximately 10 structures north of Kingsworth Avenue.

#### **4.15.5.2 Operation**

The environmental consequences of operation of the Navy Base ICTF under Alternative 3 would be similar to those discussed under Alternative 1 (Proposed Project).

### **4.15.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

From the perspective of involvement with contaminated or potentially contaminated properties, the footprint of the areas impacted by Alternative 4 is comparable to (essentially the same as) the footprint of those areas for Alternative 1 (Proposed Project). Therefore, the differences between Alternative 4 and Alternative 1 (Proposed Project) are negligible in regards to the HTRW resource.

#### **4.15.6.1 Construction**

The environmental consequences of construction of the Navy Base ICTF under Alternative 4 would be similar to Alternative 1 (Proposed Project).

#### **4.15.6.2 Operation**

The environmental consequences of operation of the Navy Base ICTF under Alternative 4 would be similar to those discussed under Alternative 1 (Proposed Project).

#### 4.15.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

The parcels of land making up the River Center project site include approximately three contaminated sites that are undergoing active monitoring. Three sites were also identified with contamination concerns that warranted further investigations. Review of the Phase I ESA for the 90.211-acre parcel identified only one REC within that tract (an indoor shooting range) and three nearby off-site RECs (that are being assessed by the Navy). One of the three RECs would not be impacted by the River Center ICTF. The Phase I ESAs for the CMCI property and the Former Naval Hospital Property identified one on-site former underground tank facility with ongoing monitoring. Further investigations were recommended for some abandoned underground tanks at the Former Naval Hospital Property and at a nearby former gas station. Multiple SWMUs, AOCs, and fuel storage tank issues were present on the River Center project site, but all had received letters from SCDHEC of No Further Action. As with Alternative 1 (Proposed Project), Alternative 5 includes proposed development of railroad infrastructure in the southern area along Spruill Avenue, at Meeting Street Road, and as far south as Milford Street (the Southern Alternatives Area). Improvements to this southern area may be impacted by an additional 14 sites that have a high risk of contamination involvement.

The number of buildings (with the potential to contain asbestos or metals-based paints) within the River Center project site is approximately 48. Portions of the River Center project site are also subject to the LUC and Navy permitting process described above for the project site. An additional approximately 20 buildings may need to be removed to accommodate the railway improvements to the south of the main site. The interaction with the Macalloy Superfund site under Alternative 5 would be limited (in a similar fashion to Alternative 1 [Proposed Project]), as only surface roads are planned in that area.

##### 4.15.7.1 Construction

The potential for the River Center project site to have involvement with contaminated soils or contaminated groundwater is probable, but less likely, than the project site. The potential for Alternative 5 to have involvement with asbestos and metals-based paints is less involved than Alternative 1 (Proposed Project) due to the River Center project site having fewer buildings with the potential to contain asbestos or metals-based paints.

The environmental consequences of construction of Alternative 5 would be similar to those discussed in Alternative 1 (Proposed Project), with the following exceptions:

- Fewer active monitoring sites would be impacted, with the associated reduced concerns about contaminated soil and dewatering effluent disposal;

- Fewer sites with contamination concerns requiring investigation would be impacted, with the associated reduced concerns about contaminated soil and dewatering effluent disposal; and
- Approximately 68 buildings would require demolition, with the associated concerns about asbestos and metals-based paints in the buildings.

#### 4.15.7.2 Operation

The environmental consequences of operation of the Navy Base ICTF at the River Center project site would be similar to those discussed under Alternative 1 (Proposed Project).

### 4.15.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth/NS –North via Hospital District)

The footprint of the areas impacted by Alternative 6 is comparable to the footprint of those areas for Alternative 5, with the significant exception that the CSX rail line leading south from the project would connect with an existing railroad corridor in the area along Spruill Avenue, but north of Kingsworth Avenue. Impacts to the commercial and industrial areas south of Kingsworth Avenue, to as far south as Milford Street (i.e., the bulk of the Southern Alternatives Area), would essentially be avoided, as discussed below.

#### 4.15.8.1 Construction

The environmental consequences of construction of the Navy Base ICTF under Alternative 6 would be similar to those associated with Alternative 5, with the following exceptions due to avoidance of the area south of Kingsworth Avenue:

- This alternative would affect only 2 of the 14 sites in the Southern Alternatives Area that pose a high risk of contamination involvement.
- The need to remove approximately 20 structures to accommodate the CSX line through the area south of Kingsworth Avenue would be avoided, resulting in less potential need for testing and/or abatement of asbestos and metals-based paints associated with these structures.
- This alternative (Alternative 6) would involve the removal of approximately 10 structures north of Kingsworth Avenue.

#### 4.15.8.2 Operation

The environmental consequences of operation of the Navy Base ICTF under Alternative 6 would be similar to those discussed under Alternative 5 (and essentially the same as Alternative 1 [Proposed Project]).



### 4.15.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)

From the perspective of involvement with contaminated or potentially contaminated properties, the footprint of the areas impacted by Alternative 7 is comparable to (essentially the same as) the footprint of those areas for Alternative 5. Therefore, the differences between Alternative 7 and Alternative 5 are negligible in regards to the HTRW resource.

#### 4.15.9.1 Construction

The environmental consequences of construction of the Navy Base ICTF under Alternative 7 would be similar to Alternative 5.

#### 4.15.9.2 Operation

The environmental consequences of operation of the Navy Base ICTF under Alternative 7 would be similar to those discussed for Alternative 5 (and essentially the same as Alternative 1 [Proposed Project]).

### 4.15.10 Related Activities

Related Activities with the potential to affect the HTRW resource include the re-use and rebuilding of railroad infrastructure within existing CSX railroad rights-of-way, such as along Meeting Street Road, to the south and southeast of the main project construction areas (for all of the alternatives). The primary contamination impacts associated with the proposed re-use of railroad lines in the Related Activity areas of the project would be the potential for involvement with soils having arsenic and BEQs contamination.

### 4.15.11 Summary of Impacts Table

Table 4.15-2 summarizes HTRW-related environmental consequences from Alternative 1 (Proposed Project) and all of the alternatives.

Table 4.15-2  
Summary of Impacts, Hazardous, Toxic, and Radioactive Waste

Alternative	Number of contaminated sites	Number of buildings requiring demolition/renovation	Contaminated Soil Impacts	Contaminated Groundwater Impacts	Superfund Sites Impacts	Asbestos-Containing Materials and Metals-Based Paints Impacts	Accidental Spills
<b>No-Action</b>	Eight active monitoring, five requiring investigation	Unknown	Potential minor adverse impacts to soil (contamination) from excavation activities (after compliance with the Navy's permitting process, RCRA Permit #SC0 170 022 560 and all applicable laws for testing and disposal of contaminated soils).	Potential minor adverse impacts to groundwater (contamination) from dewatering in excavation areas after compliance with the Navy's permitting process, RCRA Permit SC0 170 022 560, and all applicable laws for treatment and disposal of dewatering effluent.	Unknown	Potential minor adverse impact from demolition of structures with asbestos and/or metals-based paints (after survey and applicable abatement measures).	Potential for minor and/or major adverse impacts from accidental spills.

Alternative	Number of contaminated sites	Number of buildings requiring demolition/renovation	Contaminated Soil Impacts	Contaminated Groundwater Impacts	Superfund Sites Impacts	Asbestos-Containing Materials and Metals-Based Paints Impacts	Accidental Spills
<b>1: Proposed Project: CSX – Milford/ NS-Hospital District</b>	Nine active monitoring  19 requiring investigation	Approximately 150	Similar to the No-Action Alternative, but 15 more potentially contaminated sites would be impacted	Similar to the No-Action Alternative; multiple areas with groundwater monitoring that would be impacted, and more potentially contaminated sites would be impacted than the No-Action Alternative	No anticipated involvement with the Macalloy Superfund Site	Similar to the No-Action Alternative; approximately 150 buildings affected	Potential for minor and/or major adverse impacts from accidental spills resulting from use of above-ground storage tanks (ASTs) (diesel fuel), storage of other minor amounts of solvents on the premises, and from containers containing hazardous materials.
<b>2: CSX-Milford/ NS-S-line</b>	Eight active monitoring 19 requiring investigation	Approximately 120	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) but with 30 fewer buildings to be impacted	Similar to Alternative 1 (Proposed Project)



Alternative	Number of contaminated sites	Number of buildings requiring demolition/renovation	Contaminated Soil Impacts	Contaminated Groundwater Impacts	Superfund Sites Impacts	Asbestos-Containing Materials and Metals-Based Paints Impacts	Accidental Spills
<b>3: CSX-Kingsworth/NS-Hospital District</b>	Eight active monitoring seven requiring investigation	Approximately 140	Similar to Alternative 1 (Proposed Project) but 13 fewer potentially contaminated sites would be impacted	Similar to the No-Action Alternative	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) but with 10 fewer buildings to be impacted	Similar to Alternative 1 (Proposed Project)
<b>4: CSX &amp; NS-Milford</b>	Nine active monitoring  19 requiring investigation	Approximately 150	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
<b>5: River Center Project Site: CSX-Milford/NS-Hospital District</b>	Three active monitoring  17 requiring investigation	Approximately 68	Similar to Alternative 1 (Proposed Project) but with 8 fewer contaminated sites impacted	Similar to Alternative 1 (Proposed Project) but fewer areas with existing groundwater contamination and monitoring wells	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project) with 82 fewer buildings to be impacted	Similar to Alternative 1 (Proposed Project)
<b>6: River Center Project Site: CSX-Kingsworth/NS-Hospital District</b>	Three active monitoring  five requiring investigation (the least of the alternatives)	Approximately 58	Similar to Alternative 5, but with 12 fewer potentially contaminated sites impacted	Similar to Alternative 5, but with 12 fewer potentially contaminated sites impacted	Similar to Alternative 5	Similar to Alternative 5, but with 10 fewer buildings to be impacted	Similar to Alternative 5

Alternative	Number of contaminated sites	Number of buildings requiring demolition/renovation	Contaminated Soil Impacts	Contaminated Groundwater Impacts	Superfund Sites Impacts	Asbestos-Containing Materials and Metals-Based Paints Impacts	Accidental Spills
<b>7: River Center Project Site: CSX &amp; NS- Milford</b>	Three active monitoring  17 requiring investigation	Approximately 68	Similar to Alternative 5	Similar to Alternative 5,	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5

## 4.15.12 Mitigation

### 4.15.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Implement a Solid and Hazardous Waste Management Plan. (Minimization)
- Implement a Spill Prevention Control and Countermeasures (SPCC) Plan for petroleum products. (Minimization)
- Comply with Resource Conservation and Recovery Act (RCRA) and SCDHEC requirements for storage and handling of hazardous and toxic wastes. (Minimization)
- Implement waste minimization measures. (Minimization)
- Perform all land and groundwater disturbance activities in compliance with the U.S. Navy Construction Process Document (Navy "Dig" Permit), included as part of its SCDHEC RCRA Hazardous Waste Permit, which identifies the permit process and requirements for conducting construction or other land disturbing activities in Land Use Control (LUC) areas at the former CNC. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to HTRW is also provided in Chapter 6.

### 4.15.12.2 Additional Potential Mitigation Measures

No additional mitigation measures are proposed by the Corps.



## 4.16 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

### 4.16.1 Methods and Impact Definitions

Socioeconomic and Environmental Justice impacts were evaluated based on a comparison of existing community conditions in the study area to projected conditions during and after construction of the Proposed Project and alternatives. Sources of information reviewed for this analysis include U.S. Census data, regional socioeconomic projections, and data from local mapping, plans, policies, and regulations. The analysis also considers observations from field visits as well as information received from interviews with local planners, community leaders, and citizens in an effort to document community resources along with community vision, values, and goals.

Adverse impacts to the community may occur if they disrupt community cohesion or stability, have detrimental effects on the economy of the area, result in a loss of community facilities, reduce mobility, increase emergency response times, or cause recurring impacts to neighborhoods impacted by previous projects. Impacts to Environmental Justice populations are considered significant if they are disproportionately high and adverse compared to the adverse effect that would be suffered by the non-minority and/or non-low-income population. A disproportionately high and adverse effect on minority and low-income populations means an adverse effect that:

- 1) Is predominately borne by a minority population and/or a low-income population; or
- 2) Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non low-income population.

The project may also have beneficial impacts to socioeconomic resources by providing employment opportunities for the local community and the region.

Table 4.16-1  
Impact Definitions, Socioeconomics and Environmental Justice

Negligible	Minor	Major
<ul style="list-style-type: none"> <li>• No impacts to economic and business resources.</li> <li>• No loss of mobility or access.</li> <li>• No increase in emergency response times over existing conditions.</li> <li>• No impacts to neighborhoods or community resources.</li> <li>• No barriers to the elderly or handicapped persons.</li> <li>• No impacts to Environmental Justice communities.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of 10 or fewer businesses.</li> <li>• Short-term adverse construction related impacts that result in changes in access, but no loss of mobility.</li> <li>• Short-term adverse construction related impacts to emergency response times but response times under the action alternatives are not notably longer than response times under the No-Action Alternative.</li> <li>• Loss of 10 or fewer residential units from area neighborhoods and/or community resources but no loss of function.</li> <li>• Temporary barriers to the elderly or handicapped persons during construction.</li> <li>• An impact to Environmental Justice communities, but not a disproportionate impact.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of more than 10 businesses and/or insufficient relocation sites available in neighborhood.</li> <li>• Long-term changes in access or loss of access and/or mobility.</li> <li>• Increase in emergency response times under the action alternatives compared to the No-Action Alternative.</li> <li>• Loss of more than 10 residential units in a neighborhood and/or loss of connections between neighborhoods.</li> <li>• Continued adverse impacts to previously impacted neighborhoods.</li> <li>• Loss of community resources with no replacement sites available.</li> <li>• Long-term and/or permanent barriers to the elderly or handicapped persons.</li> <li>• Disproportionately high and adverse impact on Environmental Justice communities.</li> </ul>

The following sections describe the socioeconomic and Environmental Justice impacts associated with the No-Action Alternative, Alternative 1 (Proposed Project), and Alternatives 2–7. Figure 4.16-1 is a key map of notable features in the study area. Figures 4.16-2 through 4.16-8 show the alternatives in relation to socioeconomic resources. Potential impacts discussed in this section include both temporary construction impacts and permanent impacts resulting from operation of the proposed Navy Base ICTF. The types of impacts addressed include:

- Community resources, cohesion, and stability impacts (Socioeconomics)
  - Economic and business resource impacts
  - Mobility and access impacts
  - Community safety and emergency response impacts
  - Community and neighborhood impacts
  - Barriers to the elderly and handicapped persons
- Environmental Justice considerations

#### 4.16.2 No-Action Alternative

Under the No-Action Alternative, the project site and River Center project site would continue to be used for mixed-use industrial activities. Activities would likely include the demolition of existing buildings and infrastructure and the installation of new buildings and structures necessary to support the light industries and warehousing/shipping entities.

**Economic and Business Resource Impacts.** The light industrial and mixed-use development that is anticipated under the No-Action Alternative would likely create indirect, long-term economic benefits to the regional and local community as employment opportunities are directly and indirectly created as a result of future redevelopment within the project site and River Center project site. Therefore, the No-Action Alternative would result in minor beneficial impacts to economic and business resources.

**Mobility and Access Impacts.** Temporary detours during construction of light industrial and mixed-use development anticipated under the No-Action Alternative may increase travel times, change or remove access to properties, and/or limit mobility in the study area. These indirect adverse impacts would be short-term and localized to the study area. Implementation of a traffic control plan and the provision of safe and efficient detour routes and advance notice of road closures would minimize impacts; therefore, the intensity of construction-related mobility and access impacts from private developers is anticipated to be minor.

Long term mobility and access impacts associated with the No-Action Alternative would be dependent upon the location and intensity of light industrial and mixed-use development; however, road and/or rail improvements would likely result in minor adverse impacts to mobility and access so long as multiple access routes to/from the CNC are maintained, and new at-grade rail crossings have similar daily average time delays for commuters as those under existing conditions.

**Community Safety and Emergency Response Impacts.** The No-Action Alternative has the potential for minor adverse impacts to safety and emergency response if new at-grade crossings are constructed to serve the future light industrial and mixed-use facilities. The severity of these impacts would be dependent upon the location of, and delay caused by, any new at-grade crossings; however,



overall intensity of impacts to community safety and emergency response from new at-grade rail crossings would be minor if daily average time delays for commuters are similar to those experienced under existing conditions.

**Community and Neighborhood Impacts.** Construction and operation of light industrial and mixed use development would result in the loss of Sterett Hall (a community recreation center) and surrounding arts facilities. As described in Section 3.16 (Socioeconomics and Environmental Justice), Sterett Hall is an important community resource that offers recreational opportunities, an auditorium, and meeting space not available elsewhere in the community. Until recently, the City of North Charleston's Cultural Arts Department used two buildings adjacent to Sterett Hall for classrooms, artist studios, rehearsal space, and summer camps. The City of North Charleston is currently leasing Sterett Hall from Palmetto Railways. Removal of these resources would have long-term, indirect impacts to the neighborhoods surrounding the project site due to the loss of a community gathering space and individual and organized recreational and arts opportunities.

Opportunities for replacement of the programs and services provided at Sterett Hall may exist in the Chicora Life Center at the corner of McMillan Avenue and Spruill Avenue, which is planned to include a recreational facility. Per the 2012 Settlement Agreement between South Carolina Public Railways (Palmetto Railways) and the City of North Charleston, which includes the transfer of the project site (including Sterett Hall) from the City of North Charleston to Palmetto Railways, Palmetto Railways would pay a total of \$8 million to the City of North Charleston by 2016 as mitigation for rail access impacts and Palmetto Railways would assume \$6.5 million in outstanding Tax Increment Financing (TIF) obligations from the City of North Charleston. With mitigation, overall intensity of impacts is anticipated to be minor adverse during the time when a replacement facility was made; however, if no replacement is provided for services and programs currently located at Sterett Hall, the adverse impact to the community would be major adverse. Under the No-Action Alternative, there would be no adverse direct or indirect impact to Park South, the Chicora-Cherokee Neighborhood Park, or Riverfront Park.

**Barriers to the Elderly and Handicapped.** The Americans with Disabilities Act (ADA) of 1990 (PL 110-325) provides for equal opportunity for individuals with disabilities to access public and private facilities. Construction of rail served warehousing and mixed-use development would be built in compliance with ADA requirements. Therefore, the No-Action Alternative would not result in physical impacts in terms of new barriers to the elderly and handicapped.

**Environmental Justice Considerations.** Environmental Justice principles would not apply to the No-Action Alternative since no Federal action would be involved and the future development would be undertaken in accordance with local zoning regulations.

### 4.16.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

**Economic and Business Resource Impacts.** An estimated \$150 million dollars will be used to develop and construct Alternative 1 (Proposed Project). This expenditure would result in a major short-term benefit to the local and regional economy. In addition, Alternative 1 (Proposed Project) would provide indirect, long-term economic benefits to the regional and local community as employment opportunities are directly and indirectly created as a result of the project. Palmetto Railways estimates that the Navy Base ICTF would employ approximately 120 people. Alternative 1 (Proposed Project) would result in the relocation of five businesses. These businesses are located along the proposed northern and southern rail connections.

The main gate for trucks and employees to access the ICTF would be located on Hobson Avenue, to the north of Supply Street. If trucks are queuing along Hobson Avenue and blocking access to Supply Street, this activity would have an indirect adverse impact on businesses along the water that are accessed via Supply Street, including Pierside Boatworks, the H.L. Hunley Confederate Submarine (museum and tourist site), and the Clemson University Restoration Institute. This was a concern noted by business owners in the area during public meetings. Palmetto Railways has configured the facility and proposed road improvements (e.g., turning lanes) to minimize the potential for trucks obstructing access to Supply Street (and other streets near the Navy Base ICTF).

Alternative 1 (Proposed Project) has the potential for long-term indirect impacts to businesses near the project site if noise or aesthetic impacts cause a loss of customers. For example, the owner of a special events facility on the east side of North Carolina Avenue in the Chicora-Cherokee neighborhood is concerned that people will not want to rent his facility if there are noise impacts from trains and visual impacts from cranes and containers. Similarly, the owner of a software company on North Carolina Avenue at Success Street expressed reservations about investing in additional improvements to his property because the Navy Base ICTF would operate only a few hundred feet away. Proposed mitigation to minimize noise and aesthetic impacts include features such as the vegetated earthen noise berm and electric wide-span gantry cranes. These mitigation measures by Palmetto Railways would help mitigate the minor indirect adverse impacts to these businesses. Additional noise and visual resources mitigation measures are identified in Sections 4.12 and 4.11, respectively.

The northern arrival/departure track through the Hospital District has the potential to directly impact the Lowcountry Orphan Relief (see Figure 4.16-2) and an office building currently being used by the Department of Defense. The southern arrival/departure tracks for CSX would require ROW acquisition for a southern rail connection through existing industrial properties just north of Milford Street. The majority of the properties are vacant or storage lots. Businesses that could be displaced include Fraziers Ironworks, Peeples Heating and Air Conditioning, and Applied Building Sciences Inc.

Overall, impacts to economic and business resources as a result of Alternative 1 (Proposed Project) would be minor adverse in light of mitigation measures.

**Mobility and Access Impacts.** Temporary detours during construction would likely increase travel times, change or remove access to properties, and limit mobility in the project site. These indirect adverse impacts would be short-term and localized to the study area. Implementation of a traffic control plan and the provision of safe and efficient detour routes and advance notice of road closures would minimize impacts; therefore, the intensity of construction-related mobility and access impacts is anticipated to be minor adverse.

At the northern end of the project site, Alternative 1 (Proposed Project) would realign and grade-separate Cosgrove Avenue, over new rail tracks, from Spruill Avenue connecting to McMillan Avenue near Noisette Boulevard. This action would allow for the undisturbed flow of both vehicular and rail traffic. Cosgrove Avenue would serve as one of the main vehicular access points to the Proposed Project and would provide direct access to I-26. McMillan Avenue from Kephart Street to St. Johns Avenue would be eliminated. The remainder of McMillan Avenue would become an extension of St. Johns Avenue connecting to Spruill Avenue. Turnbull Avenue would be closed. The Proposed Project would affect access and mobility through the Hospital District due to the location of the northern arrival/departure track. Rental homes on the former Navy Base and Lowcountry Orphan Relief are currently accessed from Noisette Boulevard via Turnbull Avenue. These properties are located on the west side of the proposed northern NS arrival/departure track on the Hospital District and access would be disrupted if these arrival/departure tracks contain rail cars and if Turnbull Avenue was closed. Continued access to these properties from St. Johns Avenue would mitigate these minor adverse impacts. Access to rental homes, offices, and a non-profit organization (Family Corps) on the CNC east of the proposed northern arrival/departure track could be maintained from Noisette Boulevard, assuming no additional construction is proposed on the remainder of the Hospital District. At the southern end of the project site, the Viaduct Road Overpass would be closed and removed. Bainbridge Avenue and North Hobson Avenue would be realigned, including improvements to their intersection. With the removal of Viaduct Road, vehicular access to the southern end of the CNC would use the new local port access road. Stromboli Avenue would be elevated from its existing at-grade configuration. The construction of the local access segment of the Port Access Road, including the elevation of Stromboli Avenue, would be an independent project undertaken by the SCDOT, and would be completed before the closure and removal of Viaduct Road. New rail tracks would create one new major at-grade rail crossing on Meeting Street.

Alternative 1 (Proposed Project) would change the way residents of the Chicora-Cherokee neighborhood access destinations on the east side of the project site, such as the Free Harvest Medical Clinic and employment opportunities at Detyens Shipyard. These residents would no longer be able to use Reynolds Avenue or Viaduct Road to travel east to Hobson Avenue; they would have to travel farther north on Spruill to use the new Cosgrove Avenue extension (approximately a 0.5-mile



detour), or travel farther south to use the new Stromboli Avenue extension (approximately a 0.7-mile detour).

It was noted during a site visit that employees of Detyens Shipyard currently use the parking lot on the south side of McMillan Avenue, west of Noisette Boulevard, and then walk east along McMillan Avenue to access the shipyard. Alternative 1 (Proposed Project) would eliminate this parking lot and would also remove this section of McMillan Avenue, both actions of which would adversely impact parking access to the shipyard for employees; however, Palmetto Railways has held discussions with affected stakeholders about constructing a parking structure at the surface lot on the west side of Noisette Boulevard. If a parking structure is built, then there would be no adverse impact to Detyens Shipyard employee parking.

Increased rail traffic from the project would have a long-term, indirect effect on mobility in neighborhoods to the north and south of the project site (Park Circle area) in the form of longer and/or more frequent delays at at-grade rail crossings. In addition to increased delays and reduced mobility at existing at-grade crossings, Alternative 1 (Proposed Project) would also introduce one new at-grade crossing at Meeting Street. Additional delay at rail crossings was a major concern voiced by residents at public meetings who felt they currently experience lengthy delays. The intensity of this adverse impact is minor, and a discussion about the impact can be found in the traffic analysis located in Section 4.8 (Transportation).

According to the traffic analysis, in 2018 the new crossing at Meeting Street would have a daily average of 4 crossings at approximately 6 minutes each. In 2038, this would increase to a daily average of 4 crossings at approximately 11 minutes each. This additional crossing would have a minor impact on mobility in the project site.

Alternative 1 (Proposed Project) may impact the mobility of bus routes in the area. Specifically, CARTA Route 104 currently travels along McMillan Avenue to Noisette Boulevard and service could be interrupted during construction of the Cosgrove/McMillan Overpass. CARTA Routes 10 and 11 would be delayed by lengthy closures of Meeting Street at the new at-grade crossing. These interruptions to bus routes would result in a minor adverse impact because alternate routes would likely be employed by CARTA and access to areas that would be serviced by Routes 104, 10, and 11 would be maintained.

**Community Safety and Emergency Response Impacts.** Community safety and emergency response impacts associated with Alternative 1 (Proposed Project) are related to the construction of additional at-grade crossings and a notable increase in truck volumes on local streets. Construction of the rail and ROW improvements at Meeting Street for the southern rail connection would result in one new major at-grade rail crossing. This new at-grade rail crossing would have a minor indirect adverse impact to community safety by introducing a new conflict point between trains and

automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street at the location of this proposed new at-grade crossing.

This new at-grade crossing may also have a minor adverse impact on emergency response times for certain locations because there is the potential for Meeting Street to be blocked for approximately 11 minutes<sup>46</sup>, four times a day, when the CSX trains are entering and leaving the Navy Base ICTF. Detour routes are available, such as the elevated Stromboli Avenue and Cosgrove-McMillan Overpass, but the detour could increase response times, depending on the location of the emergency. The community of Union Heights must also have a minor adverse impact to emergency response if an ICTF train was blocking access on both east and west access points as it navigated the U-turn.

In the northern portion of the Navy Base ICTF, the grade separation of Cosgrove Avenue over proposed rail tracks on the project site would preserve east-west mobility for automobiles, bicycles, and pedestrians, and would preserve access to the eastern portion of the northern study area for emergency responders.

**Community and Neighborhood Impacts.** Communities and neighborhoods surrounding the project site could experience noise, air quality, and visual impacts. These impacts and proposed mitigation for them are discussed in detail in Section 4.12 (Noise), Section 4.13 (Air Quality), and Section 4.11 (Visual Resources and Aesthetics). Information from these sections is included in this section as applicable when discussing the overall range and intensity of impacts that communities and neighborhoods may experience as a result of the project alternatives. The socioeconomic impacts discussed above combined with the physical impacts discussed in other sections of this EIS have an overall impact on the communities and neighborhoods surrounding the project site. The Chicora-Cherokee neighborhood directly borders the western boundary of the project site and would be subjected to noise, air quality, aesthetic, mobility, access, and community cohesion impacts as a result of Alternative 1 (Proposed Project). Moreover, Alternative 1 (Proposed Project) would result in ROW acquisitions that would result in the relocation of approximately 106 residential units from the Chicora-Cherokee neighborhood. Any person(s) whose property needs to be acquired as a result of Alternative 1 (Proposed Project) would be compensated in accordance with the U.S. Constitution and the Uniform Act of 1970, as amended (See Chapter 8 Relevant Laws, Regulations, and Executive Orders). The loss of this housing represents approximately 6 percent of the housing units in the neighborhood. Ninety-six of the 106 residential units are renter occupied. Available housing is not available in the Chicora-Cherokee Neighborhood for all of the relocatees to stay within the neighborhood. The loss of this housing would also contribute to the trend of population loss in the neighborhood as previously identified in Section 3.16.2.1.

Noise impacts in the Chicora-Cherokee neighborhood are detailed in Section 4.12. There would be a minor to moderate adverse daytime exterior noise impact to the residential structures closest to the

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<sup>46</sup> Based on an 8,000-foot train traveling at 10 miles per hour through the crossing.

vegetated earthen berm. Exterior nighttime noise impacts for residential structures during operation of the ICTF would be major. Refer to subsection 4.12.3.5 for information on exterior to interior noise reduction. Interior noise levels are not anticipated to disrupt sleep. Air quality impacts are detailed in Section 4.13. Aesthetic impacts to the neighborhood include views of a vegetated earthen berm, a 91- to 115-foot crane, and 85-foot mast lights that would operate every night from dusk until dawn. Mobility and access impacts include changes in the way residents of the neighborhood access destinations on the east side of the project site (e.g., the Harvest Free Medical Clinic and Riverfront Park), employment opportunities at the shipyard, and potential changes and delays to bus routes.

Sterett Hall and two buildings used by the North Charleston Arts Department (recently closed) would be displaced by the No-Action Alternative and, as such, there would be a negligible impact to this community resource under Alternative 1 (Proposed Project).

Alternative 1 (Proposed Project) would not directly impact Park South, Riverfront Park, or the Chicora-Cherokee Community Park, but may indirectly impact users of the park through increased noise and visually through the presence of wide-span gantry cranes that might be seen above existing vegetated buffers.

The Olde North Charleston neighborhood generally includes the portion of the study area north of Noisette Creek. The southern portion of this neighborhood has the potential for minor adverse noise, mobility, and safety impacts as a result of the proposed northern rail line, as well as the daily addition of, on average, 1-2 commodity trains travelling through the neighborhood to and/or from CSX's Ashley Junction. As discussed in Section 4.8, the additional commodity trains are a result of the operation of the Navy Base ICTF; however, approximately 11 trains currently travel along the same route, and with equal average delays at existing at-grade rail crossings (approximately 7 to 8 minutes).

The Park Circle and Oak Park neighborhoods in the northern portion of the study area would be indirectly impacted by increased rail traffic on existing tracks and at-grade crossings on the eastern edge of the Park Circle neighborhood along Virginia Avenue, along the northern edge of the Park Circle and Oak Park neighborhoods (parallel to I-526), and within Park Circle as 1-2 additional commodity trains would traverse on existing rail across Spruill to CSX's Ashley Junction. This impact includes additional rail traffic at the at-grade crossing of North Rhett Avenue, where several people at the public meetings commented that they already experience long wait times. Based on the traffic analysis, increased rail traffic at this crossing with the Proposed Project would result in only a minor impact (approximately 4 additional trains per day in 2018 and four additional trains per day in 2038).

The Howard Heights and Union Heights neighborhoods to the south of the Navy Base ICTF would also experience an increase in rail activity on their eastern and western boundaries. Up to 4 new CSX trains would enter and exit the Navy Base ICTF. Noise and air quality impacts would be a no effect and minor adverse effect, respectively, as discussed in Sections 4.12 and 4.13. While there is already



existing train traffic to the west of Union Heights along the CSX and NS rail lines, the approximate three trains per day in 2018 under the existing condition would increase to seven trains per day (including the additional ICTF CSX trains) under Alternative 1 (Proposed Project). The Navy Base ICTF trains would result in an 11-minute average delay at the Meeting Street at-grade crossing. As a result, residents of Union Heights and Howard Heights would experience a minor adverse impact to mobility and access.

The Navy Base ICTF is not consistent with the City of North Charleston's previous vision (i.e., the Noisette Master Plan) for a mixed-use new urban community on the northern portion of the CNC. Moreover, the concept of an industrial intermodal rail facility is not what the community has been expecting based on the previous local plan. As a result, the Navy Base ICTF may indirectly impact the stability of many new businesses and residential developments that were developed in the area under the impression that they would be part of a mixed-use new urban community. At public meetings and neighborhood meetings, the community has voiced concerns that the project may reverse the positive investments and changes that have been made in the area in recent years.

**Barriers to the Elderly and Handicapped.** The project site is located on flat, level terrain that would not create barriers to access for the elderly or handicapped. Facility buildings would be built in compliance with ADA requirements. Designated ADA compliant parking spaces would be provided to assure the availability of parking and decrease the distance for elderly and disabled visitors to facility buildings. Mobility and access impacts from Alternative 1 (Proposed Project) would be short-term and localized to the project study area. ADA compliant sidewalks would be included with the Cosgrove Avenue flyover. The general population would experience delays by trains at at-grade rail crossings; therefore, the project would not result in significant impacts in terms of new barriers to the elderly and handicapped. Interruptions to bus routes would result in a minor adverse impact because alternate routes would likely be employed by CARTA and access to areas that would be serviced by Routes 104, 10, and 11 would be maintained.

**Environmental Justice Considerations.** Alternative 1 (Proposed Project) would result in a disproportionately high and adverse impact to Environmental Justice populations. The adverse impacts associated with Alternative 1 (Proposed Project) would be predominantly borne by the minority and low-income population of the Chicora-Cherokee neighborhood, and are appreciably more severe than the adverse effects that would be suffered by the non-minority and non-low-income population of the City of North Charleston and Charleston County. With regard to benefits and burdens, the benefits of Alternative 1 (Proposed Project) would extend to the greater Charleston region, while the burdens would largely be borne by the Environmental Justice community adjacent to the project site. Therefore, the benefits and burdens of Alternative 1 (Proposed Project) are not equitably distributed.

#### 4.16.4 Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)

**Economic and Business Resource Impacts.** Economic and business resource impacts under Alternative 2 would be similar to those under Alternative 1 (Proposed Project), with the exception that the proposed new NS rail track around the Spruill Avenue/Aragon Avenue/Bexley Street intersection would directly impact commercial properties (Reddy Ice, Z-Bar, and some vacant properties) in the southwest quadrant of the Spruill Avenue/Aragon Avenue/Bexley Street intersection.

**Mobility and Access Impacts.** Mobility and access impacts under Alternative 2 would be similar to those under Alternative 1 (Proposed Project), with the exception that a cul-de-sac would be constructed at the intersection of St. Johns Avenue and McMillan Avenue. This closure of St. Johns Avenue would have adverse indirect impacts to properties accessed from St. Johns Avenue, including small businesses, a church, a school, and many residences; however, the connection of Turnbull Avenue to St. Johns Avenue would be opened and, as a result, would mitigate the loss of access to a minor adverse impact by providing an alternate route that connects to Noisette Boulevard.

**Community Safety and Emergency Response Impacts.** Impacts to community safety and emergency response under Alternative 2 would be similar to those under Alternative 1 (Proposed Project); however, there are several differences. In Alternative 2, the northern rail connection for NS would be relocated along Spruill Avenue within existing CSX ROW to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line. As a result of the rail alignment, a cul-de-sac would be constructed at the southern end of St. Johns Avenue. The former Charleston Naval Complex gate at Turnbull Avenue will be reopened to provide future access between St. Johns Avenue and Noisette Boulevard. Same as Alternative 1 (Proposed Project), Alternative 2 creates a new at-grade rail crossing at the intersection of Meeting Street and Herbert Street and at O'Hear Avenue south of Bexley Street.

Alternative 2 results in a minor adverse impact to human health from delay to emergency response times for the same reasons as Alternative 1 (Proposed Project).

**Community and Neighborhood Impacts.** Community and neighborhood impacts associated with Alternative 2 would be similar to the impacts associated with Alternative 1 (Proposed Project), with the exception that residential homes along Bexley Street would be directly impacted by long-term noise impacts and train headlamps at nighttime as a result of trains operating along a new rail track just south of Bexley Street. Similarly, properties between Spruill Avenue and St. Johns Avenue, including residential homes and St. John's Catholic Church and School, would be directly impacted by long-term noise impacts from trains operating along a new rail track on the east side of Spruill Avenue (see Figure 4.16-3).

**Barriers to the Elderly and Handicapped.** Barriers to the elderly and handicapped persons under Alternative 2 would be the same as those under Alternative 1 (Proposed Project).

**Environmental Justice Considerations.** Environmental Justice impacts under Alternative 2 would be the same as Alternative 1 (Proposed Project).

#### 4.16.5      **Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

**Economic and Business Resource Impacts.** Economic and business resource impacts under Alternative 3 would be similar to those under Alternative 1 (Proposed Project), except the businesses north of Milford Street for the southern rail connection would be unaffected.

**Mobility and Access Impacts.** Mobility and access impacts under Alternative 3 would be similar to those under Alternative 1 (Proposed Project), with the exception that construction of the rail and ROW improvements under Alternative 3 would result in an at-grade crossing of Spruill Avenue and Meeting Street, west of Cooper Yard.

**Community Safety and Emergency Response Impacts.** Impacts to community safety and emergency response under Alternative 3 would be similar to those under Alternative 1 (Proposed Project); however, there are several differences. The southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW), therefore the existing at-grade crossings of Pittsburgh Avenue and Discher Street would not be impacted with ICTF train occurrences and the new at-grade crossing of Meeting Street at Herbert Street would not be created for Alternative 3. Alternative 3 would create at-grade crossings, of both Meeting Street and Spruill Avenue near Kingsworth Avenue.

The new at-grade rail crossings would have a minor indirect adverse impact to community safety by introducing new conflict points between trains and automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street and Spruill Avenue at the location of these proposed new at-grade crossings.

These new at-grade crossings may also have a moderate adverse impact on emergency response times for certain locations because there is the potential for Meeting Street and Spruill Avenue to be blocked for approximately 11 minutes<sup>47</sup>, four times a day, when the CSX trains are entering and leaving the Navy Base ICTF. Detour routes are available such as the elevated Stromboli Avenue and Cosgrove-McMillan Overpass, but the detour could increase response times, depending on the location of the emergency. The community of Union Heights, Windsor, and Howard Heights might

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<sup>47</sup> Based on an 8,000-foot train traveling at 5 miles per hour through the crossing.

also have a moderate adverse impact to emergency response if a train related to the Alternative 3 was blocking access on both east and west access points as it navigated the U-turn.

**Community and Neighborhood Impacts.** Community and neighborhood impacts associated with Alternative 3 would be similar to the impacts associated with those under Alternative 1 (Proposed Project). In addition, the new ROW acquisition for rail track and the at-grade rail crossing would directly impact the Union Heights Neighborhood and would result in the need for relocation of 8 residential units. The loss of these 8 residential units represents 1 percent of the housing units in the neighborhood and would be considered a minor impact to community cohesion since the units are currently separated from the rest of the neighborhood by the existing access ramps from Spruill Avenue to I-26. Overall, a total of 114 residential relocations would occur under Alternative 3. The southern portion of the Union Heights neighborhood would also be directly impacted by long-term noise impacts from train operations along the new rail track (see Figure 4.16-4).

**Barriers to the Elderly and Handicapped.** Barriers to the elderly and handicapped persons under Alternative 3 would be the same as those under Alternative 1 (Proposed Project).

**Environmental Justice Considerations.** Environmental Justice impacts under Alternative 3 would be the same as Alternative 1 (Proposed Project). The relocation of eight residential units in the Union Heights neighborhood is not considered to be a disproportionate adverse impact to this Environmental Justice community.

#### 4.16.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)

To the north of the intermodal facility, a rail spur or tail track, is proposed to extend from the facility through the River Center Neighborhood, as is identified for Alternative 1 (Proposed Project), but would stop short of Noisette Creek (see Figure 4.16-5).

**Economic and Business Resource Impacts.** Economic and business resource impacts under Alternative 4 would be similar to those under Alternative 1 (Proposed Project), with the exception that there would be no residential and/or business impacts within the Hospital District.

**Mobility and Access Impacts.** Mobility and access impacts under Alternative 4 would be similar to those under Alternative 1 (Proposed Project), with the exception that there would be no road and rail improvements, and associated mobility and access impediments and/or impacts, to the north of the ICTF facility.

**Community Safety and Emergency Response Impacts.** Impacts to community safety and emergency response under Alternative 4 would be the similar as those under Alternative 1 (Proposed Project); however, there are several differences. Alternative 4 is a variation of Alternative 1 (Proposed Project) where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern



rail connection, with NS connecting to an existing NS rail line near Milford Street (and adjacent to existing CSX rail and ROW). Proposed rail through the Hospital District would stop short of Noisette Creek.

In Alternative 4 both CSX and NS would use the southern rail alignment to Milford Street. Since NS would not use the Alternative 1 (Proposed Project) northern alignment, Alternative 4 would not impact the at-grade crossings of Rivers Avenue, Virginia Avenue and Avenue B. Alternative 4 would have twice as many ICTF train occurrences than Alternative 1 (Proposed Project), eight per day, at the at-grade crossings along the southern alignment. The community of Union Heights might also have a localized moderate adverse impact to emergency response if a train related to the Alternative 1 (Proposed Project) was blocking access on both east and west access points as it navigated the U-turn.

**Community and Neighborhood Impacts.** Community cohesion and stability impacts associated with Alternative 4 would be similar to those under Alternative 1 (Proposed Project).

**Barriers to the Elderly and Handicapped.** Barriers to the elderly and handicapped persons under Alternative 4 would be the same as those under Alternative 1 (Proposed Project).

**Environmental Justice Considerations.** Environmental Justice impacts associated with Alternative 4 would be the same as those under Alternative 1 (Proposed Project).

#### 4.16.7 Alternative 5: River Center Project Site (CSX – South via Milford / NS – North via Hospital District)

**Economic and Business Resource Impacts.** Similar to Alternative 1 (Proposed Project), the construction and operation of the River Center ICTF would result in major short-term and long-term economic benefits to the local area and region. Switching the location of the ICTF facility to the River Center project site under Alternative 5 would also eliminate the need to relocate the 106 residential units associated with the Chicora-Cherokee neighborhood. Alternative 5 would result in new noise and visual impacts to offices and businesses located on the east side of Noisette Boulevard adjacent to the ICTF, including the Berkeley-Charleston-Dorchester Council of Governments and 10 Storehouse Row; however, the noise abatement wall proposed along the eastern boundary of the River Center ICTF would help minimize these adverse impacts. Alternative 5 would result in the relocation of 62 residences and 18 commercial properties, including the West Yard Lofts low-income housing complex and the Lowcountry Innovation Center (see Figure 4.16-6), which houses more than 15 companies. The relocation of these businesses and low-income residents would have major short-term, localized direct adverse impacts. The owner of West Yard Lofts is under contract to provide low-income housing and is concerned about violating their contract if they are forced to relocate; however, in compliance with the Uniform Act of 1970, these impacts would be minimized by

providing relocation assistance and working with business owners and residents to find replacement facilities.

Alternative 5 would also lead to the termination of existing leases with businesses on the west side of Noisette Boulevard on the River Center project site, including Department of Defense offices, a furniture store, and a large marine container manufacturer. This alternative may also require the termination of leases for local non-profit organizations and residential properties located on the western portion of the River Center project site, depending upon the final design.

Lowcountry Orphan Relief and Palmetto Scholars Academy are also located in the vicinity of the River Center project site, but would not be directly impacted as currently designed. Palmetto Scholars Academy is in the process of relocating to another location several miles from the River Center project site and would be relocated prior to any construction of a River Center ICTF; therefore, no impacts would occur. Lowcountry Orphan Relief includes a donation center and is heavily reliant on volunteers. It also hosts several large outdoor events each year. This facility would be indirectly impacted if the volunteers lose easy access for donors and volunteers, or if outdoor events are affected by the presence of the River Center ICTF.

For Alternative 5, the main gate for trucks coming from I-26 would be located on an extension of Cosgrove Avenue. Based on the traffic analysis, the annual average daily volume of trucks on Cosgrove Avenue east of Spruill Avenue would be approximately 2,200 in 2018 under Alternative 2 compared to 85 under the No-Action Alternative. This volume of trucks would have a notable long-term, indirect adverse impact on businesses located along Cosgrove Avenue, including small shops and offices, a hair salon, a bank, and the Charleston County Department of Social Services. Customers may have a difficult time accessing these businesses, and may be deterred from patronizing these businesses, if there is an increase in the volume of trucks along the road.

**Mobility and Access Impacts.** As with Alternative 1 (Proposed Project), temporary detours during construction of Alternative 5 would likely increase travel times, change or remove access to properties, and limit mobility in the project site and River Center project site. These indirect, minor adverse impacts would be short-term and localized to the study area. Implementation of a traffic control plan and the provision of safe and efficient detour routes and advance notice of road closures would minimize adverse impacts.

Alternative 5 would make it more difficult for residents of neighborhoods west and south of the River Center ICTF to access destinations to the east of it, including Riverfront Park. Similar to Alternative 1 (Proposed Project), this alternative would adversely impact access to parking for Detyens Shipyard employees using the parking lot along McMillan Avenue; however, as with Alternative 1 (Proposed Project), it is assumed that Palmetto Railways would coordinate with the shipyard and provide replacement parking for its employees as a mitigation measure. Alternative 5 would impact CARTA Route 104, which currently runs along Spruill Avenue, Noisette Boulevard, and McMillan Avenue in

the study area. Alternative 5 would eliminate access between Spruill Avenue and Noisette Boulevard in the vicinity of McMillan Avenue, and no alternate route is provided. Therefore, CARTA Route 104 would have to be re-routed. In addition, access to the CARTA Superstop at the corner of Cosgrove Avenue and Rivers Avenue would likely be impacted by a high volume of trucks travelling on Cosgrove Avenue to access the ICTF. This traffic may make it difficult for buses and riders to access the facility, and may also pose a potential safety issue due to high pedestrian activity near the Superstop, resulting in the potential for a minor adverse impact.

Alternative 5 would introduce additional traffic onto St. Johns Avenue due to the location of the employee entrance on St. Johns Avenue at Turnbull Avenue. This traffic may result in adverse access impacts for St. John's Catholic Church and School, which is located adjacent to the proposed employee entrance; however, Alternative 5 has an increase of only approximately 600 vehicles per day on St. Johns Avenue over the No-Action Alternative. This is a relatively small increase over a 24-hour period. Additionally, St. Johns Avenue and the ICTF employee driveway would operate at acceptable levels of service in both 2018 and 2038. Therefore, any access impacts to St. John's Catholic Church and School would be negligible.

**Community Safety and Emergency Response Impacts.** Community safety and emergency response impacts associated with Alternative 5 are generally related to the construction of the additional at-grade crossing and a notable increase in truck volumes on local streets.

Alternative 5 would result in a potential minor adverse impact to community safety and emergency response as it would eliminate several east-west routes in the study area. McMillan Avenue and Reynolds Avenue would no longer provide a connection from Spruill Avenue to Noisette Boulevard. Cosgrove Avenue east of Spruill Avenue would only provide access to the River Center project site. The closest EMS station is located on Dorchester Road west of the DCIA. Emergency responders coming from the west side of the DCIA would have to go north of Noisette Creek then east to connect to Noisette Boulevard to access properties along the Cooper River. Emergency responders dispatching from Fire Station 2 on the corner of Carner Avenue and Clement Avenue would have to travel south to the future Stromboli Avenue Bridge over rail tracks then north on the improved Bainbridge Avenue to access properties on the Cooper River.

Similar to Alternative 1 (Proposed Project), construction of the rail and ROW improvements at Meeting Street for the southern rail connection would result in one new major at-grade rail crossing. This new at-grade rail crossing would have a potential minor, indirect adverse impact to community safety by introducing a new conflict point between trains and automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street at the location of this proposed new at-grade crossing.

The removal of east-west access and the new at-grade crossing would have a minor adverse impact on emergency response times. The closest EMS station is located on Dorchester Road west of the

DCIA. Emergency responders coming from the west side of the DCIA would have to go north of Noisette Creek then east to connect to Noisette Boulevard to access properties along the Cooper River. Emergency responders dispatching from Fire Station 2 on the corner of Carner Avenue and Clement Avenue would have to travel south to the future Stromboli Avenue Bridge over rail tracks then north on the improved Bainbridge Avenue to access properties on the Cooper River.

Similar to Alternative 1, there would be the potential for Meeting Street to be blocked by a train for approximately 11 minutes<sup>48</sup>, four times a day when the CSX trains are entering and leaving the River Center ICTF. The CARTA Superstop is located at the corner of Cosgrove Avenue and Rivers Avenue. Alternative 5 would result in a high volume of trucks (2,161 trucks per day in 2018) traveling on Cosgrove Avenue to access the ICTF. These trucks could pose a safety concern to pedestrians walking to and from the buses.

**Community and Neighborhood Impacts.** Communities and neighborhoods surrounding Alternative 5 would experience similar noise, air quality, and visual impacts as those under Alternative 1 (Proposed Project). Neighborhoods within the study area (shown on Figure 3.16-2) include Olde North Charleston, Chicora-Cherokee (made up on Chicora Place and Cherokee Place), Windsor, Howard Heights, and Union Heights. Alternative 5 would directly impact the Chicora-Cherokee neighborhood and the West Yard Lofts low-income community, and would indirectly impact the Olde North Charleston, Park Circle, and Oak Park neighborhoods.

Alternative 5 includes the extension of arrival/departure tracks, to the south, and a drayage road adjacent to the Chicora-Cherokee neighborhood between Reynolds Avenue and Viaduct Road. The drayage road would expose the neighborhood to noise impacts from trains on the arrival/departure tracks as well as noise and air quality impacts from diesel trucks on the drayage road. These direct, long-term impacts would occur 24 hours per day. It should be noted that due to a longer drayage road between the ICTF and the port, Alternative 5 would require twice as many trucks traveling on the drayage road to transport the same volume of containers as Alternative 1. It is assumed that the project site would still be developed with industrial or warehousing uses as indicated under the No-Action Alternative. Therefore, Sterett Hall and the arts building would still be lost, and community resources, cohesion, and stability impacts associated with the No-Action Alternative would also apply to Alternative 5 without a replacement facility.

Alternative 5 would not directly impact Park South, Riverfront Park, or the Chicora-Cherokee Community Park; however, it would create indirect minor adverse impacts as a result of increased noise from truck traffic and visual impacts as a result of the wide-span gantry cranes.

Similar to Alternative 1 (Proposed Project), the southern portion of the Olde North Charleston neighborhood has the potential for minor, indirect noise, mobility, and safety adverse impacts as a

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<sup>48</sup> Based on an 8,000-foot train traveling at 5 miles per hour through the crossing.



result of the proposed rail lines and at-grade crossings along Virginia Avenue as part of Alternative 5.

Alternative 5 would directly impact community resources on the River Center project site, including West Yard Lofts and the Lowcountry Innovation Center, and would result in major adverse impacts related to the relocations.

The Park Circle and Oak Park neighborhoods would experience similar impacts associated with a River Center ICTF as those under Alternative 1 (Proposed Project).

**Barriers to the Elderly and Handicapped.** Barriers to the elderly and handicapped persons under Alternative 5 would be the same as those under Alternative 1 (Proposed Project).

**Environmental Justice Considerations.** Alternative 5 has the potential for disproportionately high and adverse impacts to Environmental Justice populations, primarily the residents associated with West Yard Lofts. The adverse impacts associated with Alternative 5 would be predominantly borne by the minority and low-income population and are appreciably more severe than the adverse effects that would be suffered by the nonminority and non-low-income population of the City of North Charleston and Charleston County. With regard to benefits and burdens, the benefits of Alternative 5 would extend to the greater Charleston region, while the burdens would be borne by the Environmental Justice community adjacent to the project. Therefore, the benefits and burdens of Alternative 5 are not equitably distributed.

#### 4.16.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS – North via Hospital District)

Alternative 6 is the same as Alternative 5 with the exception that the southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW). Construction of the rail and ROW improvements under Alternative 6 would result in a new at-grade crossing at Spruill Avenue and Meeting Street. This new track and at-grade rail crossing would directly impact the Union Heights Neighborhood from ROW acquisition and residential relocations. The southern portion of the neighborhood would also be directly impacted by long-term noise impacts from operating along the new rail track (see Figure 4.16-7).

**Economic and Business Resource Impacts.** Economic and business resource impacts under Alternative 6 would be similar to those under Alternative 5, with the exception that the businesses north of Milford Street for the southern rail connection would be unaffected.

**Mobility and Access Impacts.** Mobility and access impacts under Alternative 6 would be similar to those under Alternative 5.

**Community Safety and Emergency Response Impacts.** Impacts to community safety and emergency response under Alternative 6 would be similar to those under Alternative 5; however, there are differences. The southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW), therefore the existing at-grade crossings of Pittsburgh Avenue and Discher Street would not be impacted with ICTF train occurrences and the new at-grade crossing of Meeting Street at Herbert Street would not be created for Alternative 6. Alternative 6 would create at-grade crossings of both Meeting Street and Spruill Avenue near Kingsworth Avenue.

The new at-grade rail crossings would have a minor indirect adverse impact to community safety by introducing new conflict points between trains and automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street and Spruill Avenue at the location of these proposed new at-grade crossings.

These new at-grade crossings may also have a moderate adverse impact on emergency response times for certain locations because there is the potential for Meeting Street and Spruill Avenue to be blocked for approximately 11 minutes[2], four times a day, when the CSX trains are entering and leaving the Navy Base ICTF. Detour routes are available such as the elevated Stromboli Avenue and Cosgrove-McMillan Overpass, but the detour could increase response times, depending on the location of the emergency. The community of Union Heights, Windsor, and Howard Heights might also have a moderate adverse impact to emergency response if a train related to the Alternative 6 was blocking access on both east and west access points as it navigated the U-turn.

The City of Charleston's planned public service operation center would not be impacted by Alternative 6.

**Community and Neighborhood Impacts.** Community and neighborhood impacts associated with Alternative 6 would be similar to those under Alternative 5, with the exception that eight residential units would be displaced in the Union Heights Neighborhood for new rail tracks. This loss of these eight residential units represents 1 percent of the housing units in the neighborhood and would be considered a minor adverse impact to community cohesion since the units are currently separated from the neighborhood by the existing access ramps from Spruill Avenue to I-26. A total of 70 residential relocations would be required as part of Alternative 6.

**Barriers to the Elderly and Handicapped.** Barriers to the elderly and handicapped persons under Alternative 6 would be the same as those under Alternative 1 (Proposed Project).

**Environmental Justice Considerations.** Environmental Justice impacts associated with Alternative 6 would be similar to Alternative 5. The relocation of eight residential units in the Union Heights neighborhood is not considered to be a disproportionate adverse impact to this Environmental Justice community.

#### 4.16.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)

**Economic and Business Resource Impacts.** Economic and business resource impacts under Alternative 7 would be similar to those under Alternative 5.

**Mobility and Access Impacts.** Mobility and access impacts under Alternative 7 would be similar to those under Alternative 5.

**Community Safety and Emergency Response Impacts.** Impacts to community safety and emergency response under Alternative 7 would be the similar as those under Alternative 5; however, there are several differences. Alternative is a variation of Alternative 5 where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection, with NS connecting to an existing NS rail line near Milford Street (and adjacent to existing CSX rail and ROW). Proposed rail through the Hospital District would stop short of Noisette Creek (Figure 4.16-8).

In Alternative 7 both CSX and NS would use the southern rail alignment to Milford Street. Alternative 7 would have twice as many ICTF train occurrences than Alternative 5, eight per day, at the at-grade crossings along the southern alignment. The community of Union Heights might also have a moderate adverse impact to emergency response if a train related to Alternative 5 was blocking access on both east and west access points as it navigated the U-turn. In addition, the construction of the drayage road from the River Center project site for Alternative 7 limits east-west mobility throughout the study area.

Alternative 7 results in a minor impact to human health from delay to emergency response times for the same reasons as Alternative 1 (Proposed Project).

**Community and Neighborhood Impacts.** Community cohesion and stability impacts associated with Alternative 7 would be similar to those under Alternative 5.

**Barriers to the Elderly and Handicapped.** Barriers to the elderly and handicapped persons under Alternative 7 would be the same as those under Alternative 1 (Proposed Project).

**Environmental Justice Considerations.** Environmental Justice impacts associated with Alternative 7 would be the same as those under Alternative 5.

#### 4.16.10 Related Activities

If the Proposed Project is constructed, a section of unimproved CSX ROW would have to be activated with rail lines that would accept intermodal trains at the proposed new at-grade crossing at Meeting Street in the vicinity of Discher Street. This Related Activity would apply to Alternatives 1, 2, 4, 5, and 7. Under Alternatives 3 and 6, the Related Activity construction would begin at the proposed new at-

grade crossing at Meeting Street in the vicinity of Kingsworth Avenue. Alternative 2 requires the reactivation of an out-of-service ROW and construction of a new railroad bridge to connect the NS arrival/departure track to the north from the ICTF across a portion of marsh that drains to Noisette Creek to the existing NCTC track along Virginia Avenue.

**Economic and Business Resource Impacts.** Direct or indirect impacts to economic and business resources are not anticipated from the Related Activities. There would be no relocations associated with the Related Activities.

**Mobility and Access Impacts.** Direct impacts to mobility and access would result from the reactivation of rail tracks and train lengths. The increased train activity is likely to increase delay to pedestrians and vehicle traffic at all associated at-grade rail crossings.

**Community Safety and Emergency Response Impacts.** Adverse indirect impacts to community safety and emergency response are anticipated from project Related Activities. Increased train activity could result in a delay for emergency responders at all associated at-grade rail crossings.

**Community and Neighborhood Impacts.** Direct impacts to community cohesion and stability are not anticipated from the project Related Activities.

**Barriers to the Elderly and Handicapped.** Related Activities of the Proposed Project would not result in barriers to the elderly and handicapped.

**Environmental Justice Considerations.** Adverse indirect impacts from noise are anticipated from increased train activity with project Related Activities.

#### 4.16.11 Summary of Impacts Table

Table 4.16-2 summarizes the environmental consequences to socioeconomics and environmental justice from the Proposed Project and all of the alternatives.



Table 4.16-2  
Summary of Impacts, Socioeconomics and Environmental Justice

Alternative	Community Resources, Cohesion, and Stability					Environmental Justice Considerations
	Economic and Business Resource Impacts	Mobility and Access Impacts	Community Safety and Emergency Response Impacts	Community and Neighborhood Impacts	Barriers to the Elderly and Handicapped	
<b>No-Action</b>	Negligible as there are no impacts to economic and business resources.	Minor impact from private developer construction.	Potential for minor adverse impacts from any new at-grade crossings.	Major impact from displacement of Sterett Hall and surrounding arts facilities.	Negligible as there is no physical impact in terms of new barriers to the elderly and handicapped.	Not applicable (no Federal action).
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Major short-term and long-term benefit to local and regional economy; minor indirect adverse impact to local businesses adjacent to project (access, relocations, and aesthetics)	Minor short-term adverse impacts from construction; minor adverse access impacts for Chicora-Cherokee residents; minor adverse mobility impacts from new at-grade rail crossings and increased delay at intersections and at-grade crossings.	Potential minor adverse emergency response time impacts due to additional delay at at-grade crossings; potential minor safety impacts due to additional conflict points at at-grade crossings.	Negligible impact from displacement of Sterett Hall and surrounding arts facilities as they would be displaced with or without Alternative 1 (Proposed Project). Major adverse impacts to Chicora-Cherokee neighborhood from 106 residential displacements; minor to moderate impact from visual and noise impacts. Minor adverse impacts to Olde North Charleston and Union Heights/ Windsor neighborhoods from noise.	Negligible impact in terms of new barriers to the elderly and handicapped.	Major adverse impact from displacement of 106 residential units would result in a disproportionately high and adverse impact to Chicora Cherokee neighborhood.

Alternative	Community Resources, Cohesion, and Stability					Environmental Justice Considerations
	Economic and Business Resource Impacts	Mobility and Access Impacts	Community Safety and Emergency Response Impacts	Community and Neighborhood Impacts	Barriers to the Elderly and Handicapped	
<b>2: CSX – Milford / NS – S-line</b>	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed project), with an additional minor adverse impact from creation of cul-de-sac at St. Johns Avenue and McMillian Avenue.	Similar to Alternative 1 (Proposed Project), but indirect minor adverse impacts (noise, light, and glare) to residents and businesses along Spruill Avenue and Bexley Street corridor.	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Same disproportionately high and adverse impact on Chicora-Cherokee neighborhood as Alternative 1 (Proposed Project).
<b>3: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 1 (Proposed Project); however, businesses north of Milford Street would be avoided.	Similar to Alternative 1 (Proposed Project). Location of Meeting Street at-grade crossing is located at Kingsworth Avenue.	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project), but with an additional eight residential displacements from Union Heights neighborhood.	Same as Alternative 1 (Proposed Project).	Same disproportionately high and adverse impact on Chicora-Cherokee neighborhood as Alternative 1 (Proposed Project).
<b>4: CSX &amp; NS – Milford</b>	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Same as Alternative 1 (Proposed Project).	Same disproportionately high and adverse impact on Chicora-Cherokee neighborhood as Alternative 1 (Proposed Project).

Alternative	Community Resources, Cohesion, and Stability					Environmental Justice Considerations
	Economic and Business Resource Impacts	Mobility and Access Impacts	Community Safety and Emergency Response Impacts	Community and Neighborhood Impacts	Barriers to the Elderly and Handicapped	
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	Short-term and long-term benefit to local and regional economy; direct adverse impacts to businesses on River Center project site; major direct adverse impacts to businesses relocations along Noisette Boulevard and the Lowcountry Innovation Center; minor adverse impact to properties adjacent to project (truck traffic, noise, aesthetics).	Minor, long-term adverse impact to east-west mobility for residents and businesses within the study area; Closure of McMillan Avenue would result in a minor adverse impact from the disruption of t CARTA Route 104).	Potential for minor adverse impact, as a result of limited east-west access to the study area. Potential for minor safety adverse impacts due to additional conflict points at at-grade crossings.	Negligible impact from displacement of Sterett Hall and surrounding arts facilities. Major impacts to Chicora-Cherokee neighborhood (visual and noise). Major adverse impact to River Center neighborhood from displacement of 62 residential units (includes 60-unit West Yard Lofts). Minor indirect adverse impacts to Olde North Charleston and Union Heights neighborhoods (noise)	Same as Alternative 1 (Proposed Project).	Major adverse impact from displacement of the 60-unit West Yard Lofts low-income housing development would result in a disproportionately high and adverse impact
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 5; however, businesses north of Milford Street would be avoided.	Same as Alternative 5.	Same as Alternative 5.	Similar to Alternative 5, with an additional eight residential displacements from the Union Heights neighborhood.	Same as Alternative 1 (Proposed Project).	Same as Alternative 5
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Same as Alternative 1 (Proposed Project).	Same as Alternative 5.

## 4.16.12 Mitigation

### 4.16.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Construct a noise abatement wall in areas where there are engineering and environmental constraints with the earthen berm. (Minimization)
- Palmetto Railways is working with DHEC and community groups to determine concerns and identify mitigation measures. (Minimization)
- \*An expanded community mitigation plan will be developed in partnership with community organization and State agencies. (Minimization)
- \*A community engagement and awareness plan (Appendix B) is being implemented to keep stakeholders and the public engaged and informed. (Minimization)
- Contribute \$8 million to the City of North Charleston to mitigate the impacts to the adjacent communities including loss of Sterett Hall. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to socioeconomics and Environmental Justice is also provided in Chapter 6.

### 4.16.12.2 Additional Potential Mitigation Measures

No additional mitigation measures have been recommended by the Corps.





- A1 Dorcas Residential Care
- A2 Guardian Angles Residential Care
- A3 Evergreen Residential Care
- A4 Palmetto Residential Care of North Charleston
- A5 Ivory's Loving Care Residential Facility



- S1 (Temporary) Chicora Elementary School
- S2 Owens Christian Academy
- S3 (Future) Chicora Elementary School
- S4 Military Nagnet Academy
- S5 Mary Ford Elementary School
- S6 Greg Mathis High School



- C1 Saint Johns Catholic Church
- C2 Washington United Methodist Church
- C3 St. Matthews Church
- C4 Emanuel Seed - Harvest Time Church
- C5 Salvation & Deliverance Church
- C6 The House of God North Union Heights
- C7 New Francis Brown United
- C8 New St. John Holiness Church
- C9 Bethlehem Baptist Church
- C10 Evening of Prayer Church of God In Christ
- C11 Mt. Olive Baptist Church
- C12 Grace Community Baptist Church
- C13 Calvary AME Church
- C14 Open Door United Bibleway Church of Christ
- C15 Masjid Al Jami Ar-Rsheed
- C16 Promised Land Pentecostal Holiness Church



- CM1 Saint Peter's Cemetery Extension



- E1 Charleston County EMS Reynolds Ave Station



- F1 City of North Charleston (Station 2)



- L1 Cooper River Memorial Library



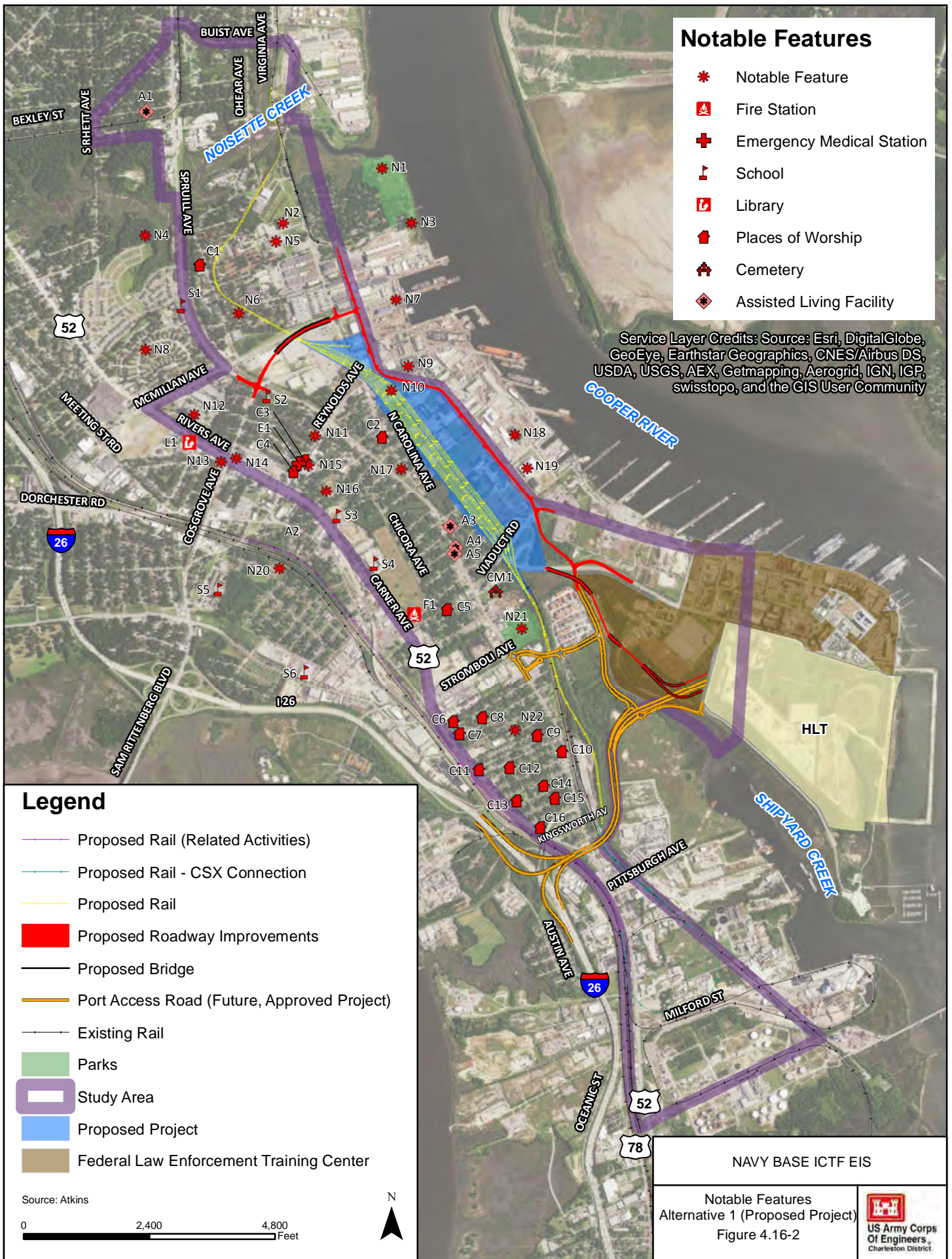
- N1 Riverfront Park
- N2 West Yard Lofts
- N3 Greater Charleston Naval Base Memorial
- N4 North Park Village Park
- N5 Lowcountry Innovation Center
- N6 Lowcountry Orphan Relief
- N7 Deytens Shipyard
- N8 St. Charles Place
- N9 Harvest Free Medical Clinic
- N10 Sterett Hall
- N11 Live Oak Senior Center
- N12 Chicora Life Center
- N13 North Charleston Police Station Bureau
- N14 CARTA Superstop
- N15 Metanoia
- N16 Gussie Greene Community Center
- N17 Chicora-Cherokee Park and Garden
- N18 HL Hunley Confederate Submarine
- N19 Clemson University Restoration Institute
- N20 Accabee Recreation Center
- N21 Park South
- N22 Gethsemani Community Center

NAVY BASE ICTF EIS

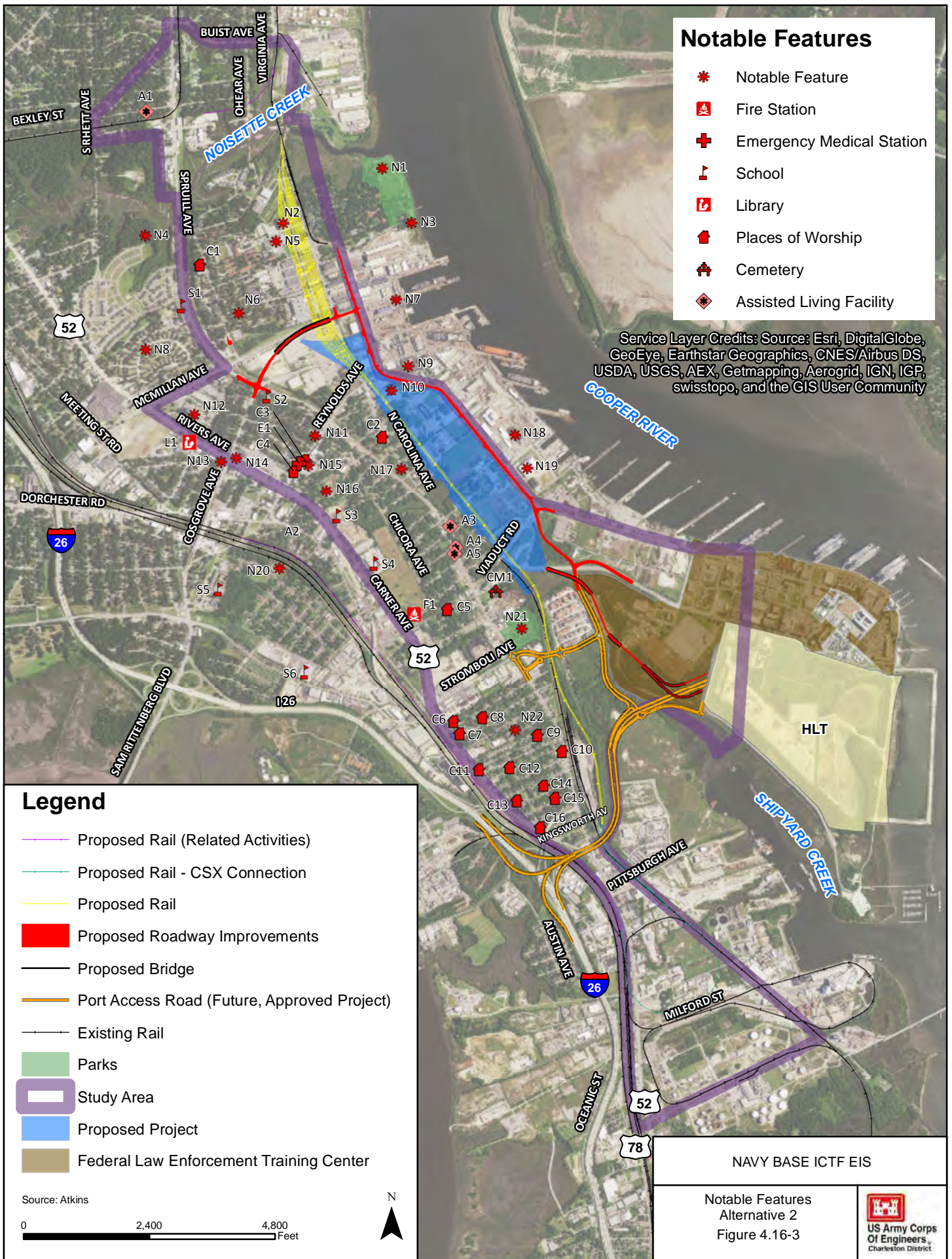
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Figure 4.16-1



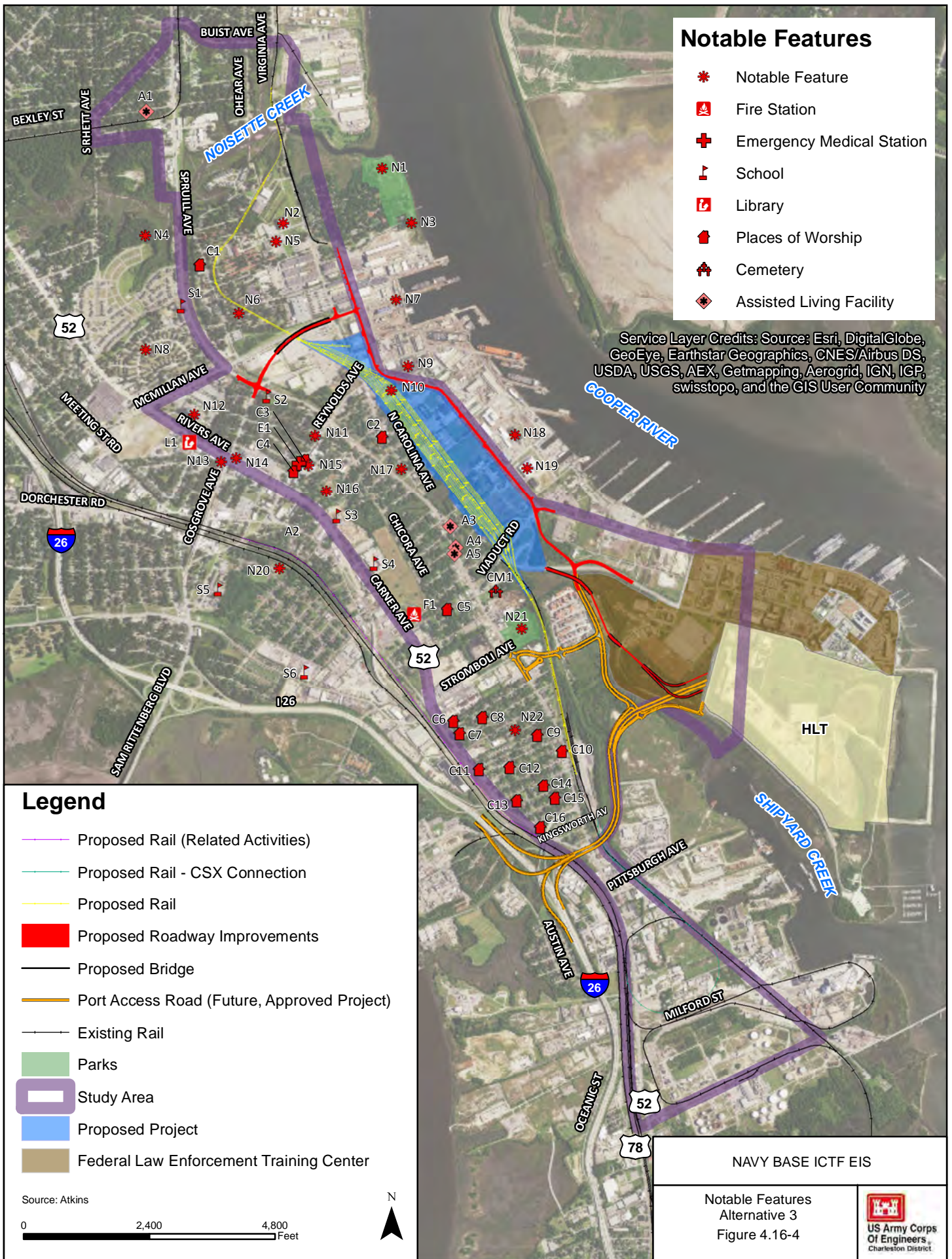




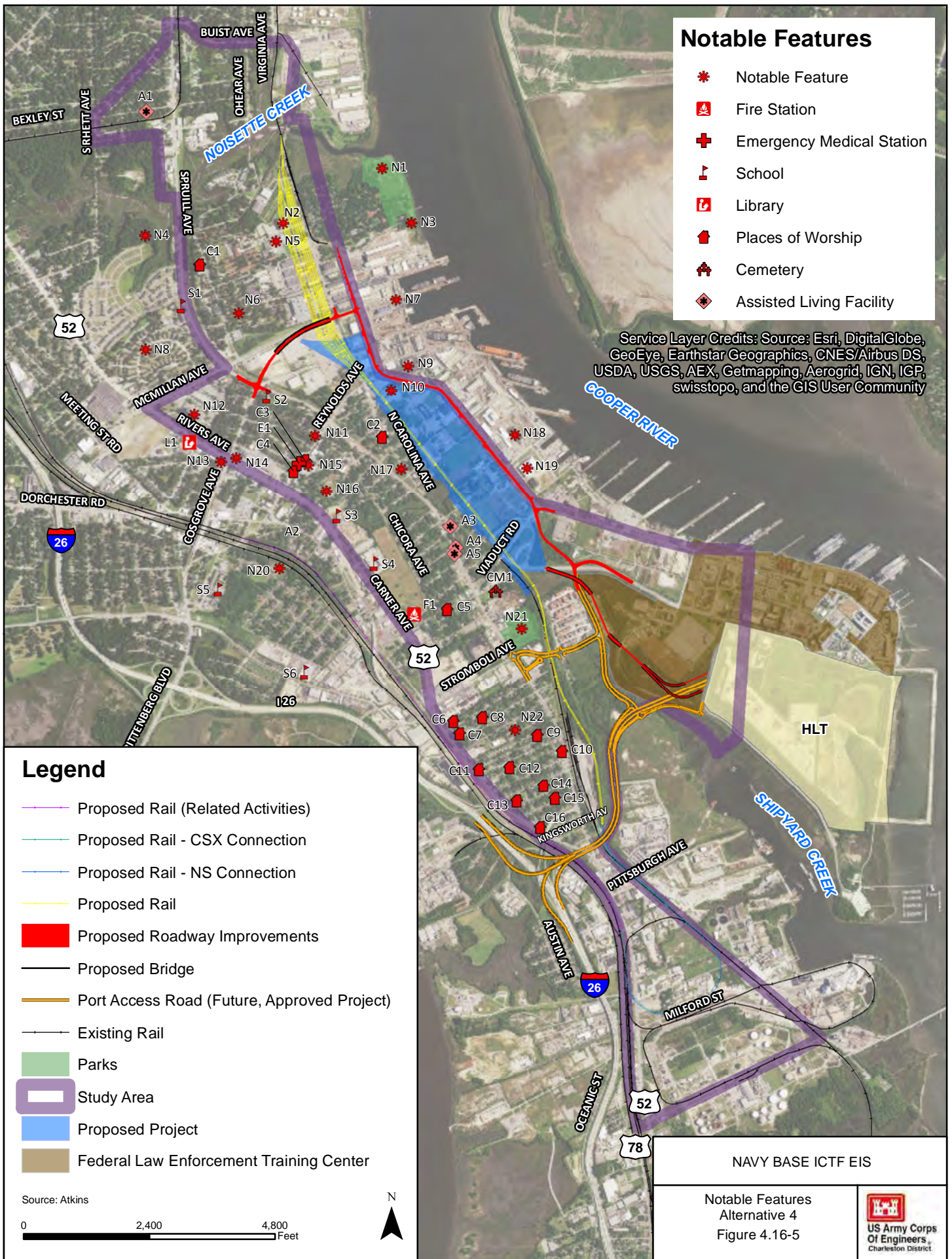




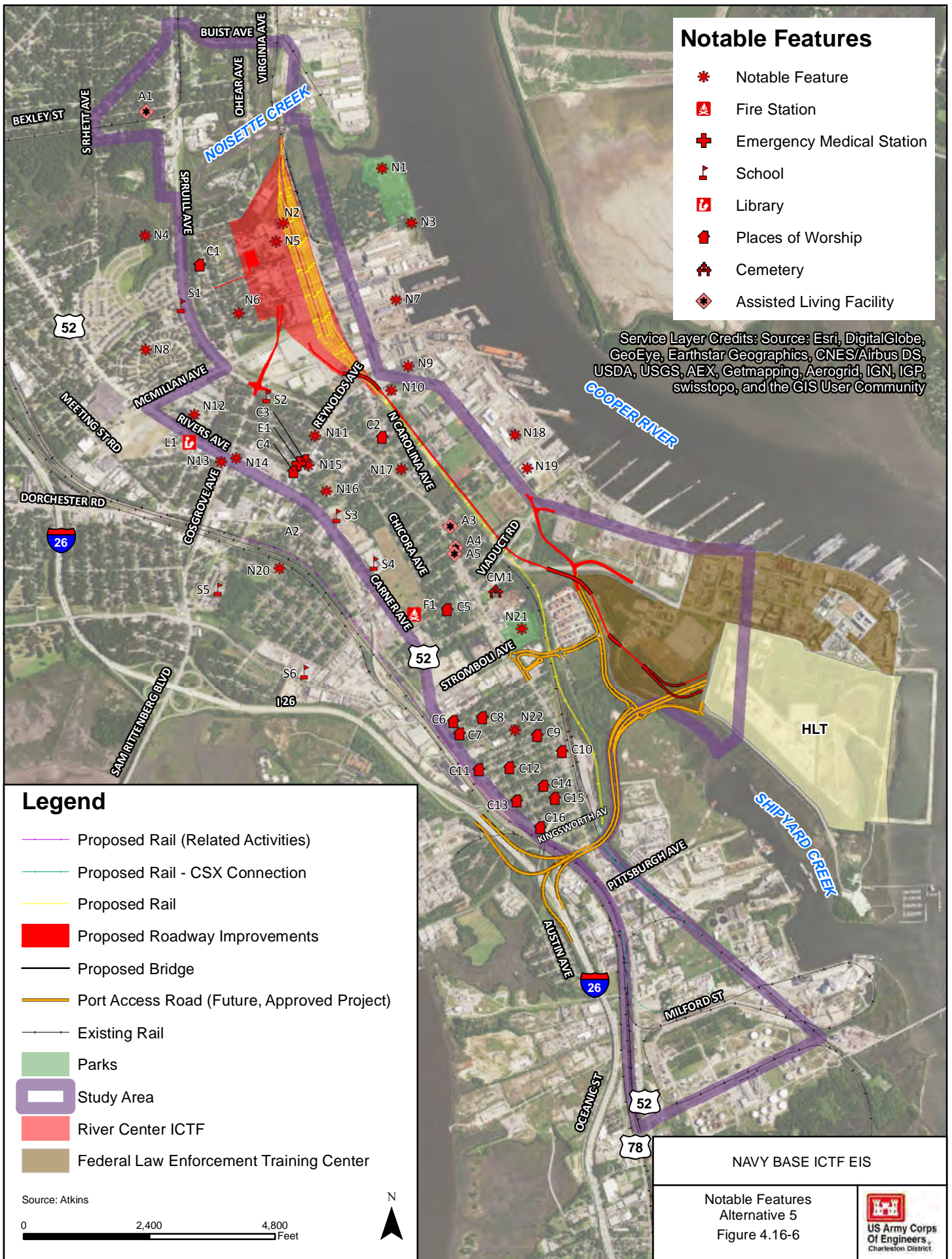




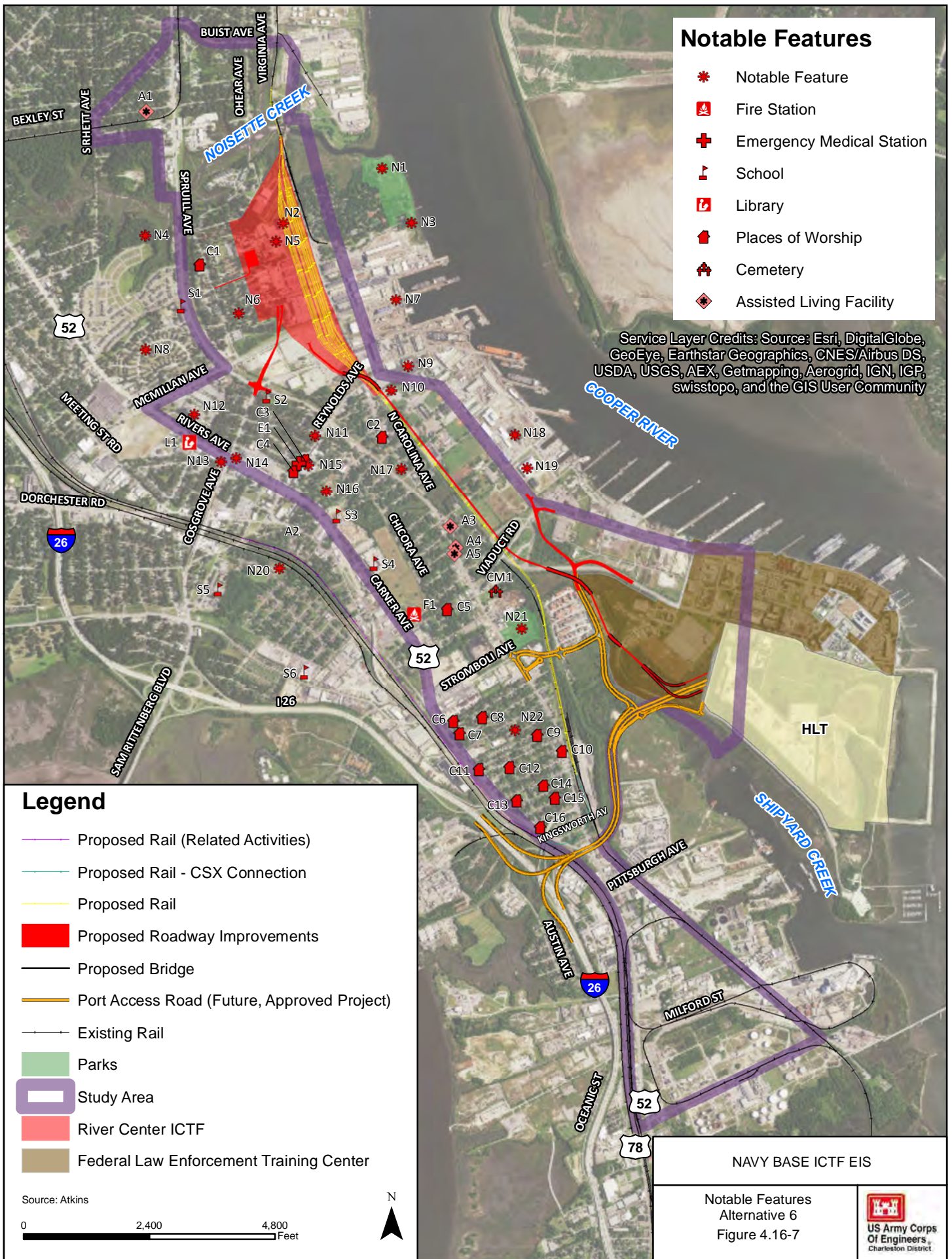




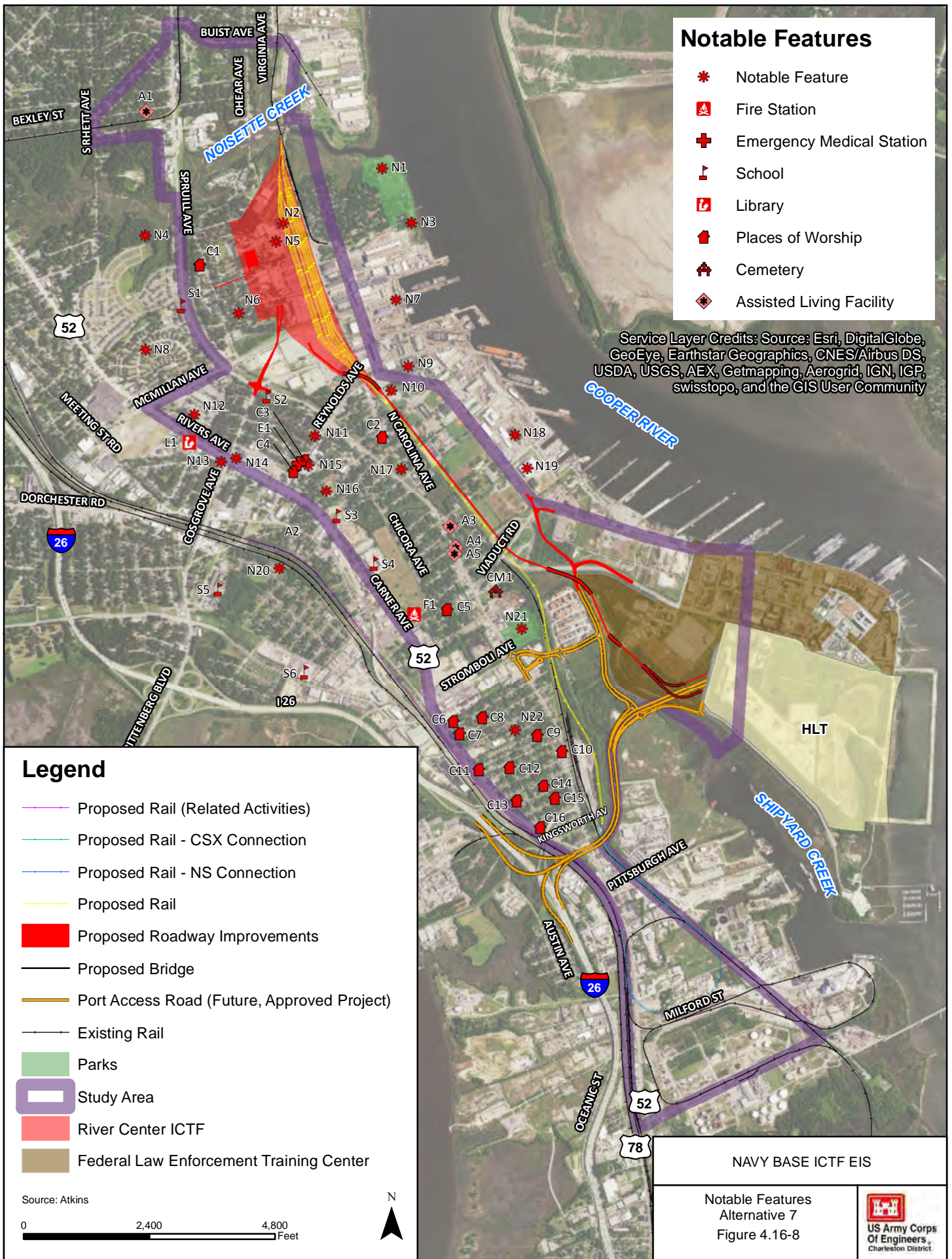














## **4.17 HUMAN HEALTH AND SAFETY**

### **4.17.1 Methods and Impact Definitions**

The Proposed Project has the potential to impact the human health and safety of the community surrounding it. Each of the other resource sections in this document was reviewed to determine if there would be potential associated impacts to human health and safety. Affected Environment and Environmental Consequences sections for Water Quality (Section 3.3/4.3), Visual Resources and Aesthetics (Section 3.11/4.11), Noise and Vibrations (Section 3.12/4.12), Air Quality (Section 3.13/4.13), Socioeconomics and Environmental Justice (3.16/4.16), and Hazardous, Toxic, and Radioactive Waste (Section 3.15/4.15) describe existing conditions and provide inventories of known and potential risks due to the Proposed Project and alternatives to human health and safety.

The purpose of this environmental consequences section is to compile and document potential impacts to the human health and safety of construction workers during construction of the Proposed Project, operations staff during the operation of the Proposed Project, and residents in the community surrounding the Proposed Project.

Adverse impacts to human health and safety may occur if the Proposed Project activities create new health hazards that are not currently present, worsen existing health conditions, or increase emergency response times.

### **4.17.2 No-Action Alternative**

The No-Action Alternative would involve the construction of rail-served warehousing and mixed-use development on the project site and River Center project site. Potential risks to human health and safety under the No-Action Alternative are identified by impact type.

#### **4.17.2.1 Worker Safety**

Under the No-Action Alternative, the potential for direct worker health impacts from heavy equipment is similar to the existing condition risk potential. Any ongoing monitoring of known hazardous material sites would continue in accordance with previous permit requirements and BMPs. Existing worker health conditions would generally be expected to continue. Therefore, there is a negligible impact to worker health and safety by the No-Action Alternative.

#### **4.17.2.2 Drinking Water Quality**

As noted in Section 4.3, water supply sources for all of North Charleston are located outside of the study area (Bushy Park Reservoir and Edisto River) and would not be impacted by others from construction activities or disturbance of known contaminated groundwater sources. Therefore, there

is a negligible impact to human health and safety from drinking water quality impacts by the No-Action Alternative.

#### 4.17.2.3 Noise and Vibration

Noise is defined as unwanted sound. According to the USEPA, human health concerns related to noise include “stress-related illnesses, high blood pressure, speech interference, hearing loss, sleep disruption, and lost productivity” (USEPA 2014d). Potential noise from the proposed facility has been identified as a major concern of local residents. The noise and vibration analysis includes four types of potential noise impacts that could affect human health. These impact types are traffic noise, rail noise (includes horns), rail vibration, and operational noise from the project site.

For the Chicora-Cherokee residential community west of the project site, ambient noise conditions were estimated using the field-measured existing noise levels in the community. From the measurement data for these locations provided in Section 3.12, the average existing ambient noise level of 51 dB(A) is estimated for the Chicora-Cherokee community adjoining the project site. Due to operations of the future rail-served warehousing and distribution center as described for the No-Action Alternative above, the ambient noise level in the community is assumed to grow by 2 to 4 dB(A) in 24 years from 2014 to 2038. As a result, the No-Action ambient noise level of approximately 54 dB(A) [ $51 + 3 = 54$ ] is estimated for the community in 2038.

Ambient noise is also assessed for the residential community of CNYOQ Historic District, east of the River Center project site. From the 2014 field noise measurements described in Section 3.12.4 for locations at Manley Avenue (Table 3.12.1, locations M17 and M18), the average existing ambient noise level of 56 dB(A) is estimated for the community. With a 3 dB(A) growth to 2038, the No-Action ambient noise level would be expected around 59 dB(A) for this community. This No-Action ambient noise level is used for assessing the operational noise impact of the River Center project site.

#### Traffic Noise

As noted in Section 4.12 Noise and Vibration, the No-Action Alternative represents the future without the Proposed Project and is used as a baseline from which to compare the action alternatives. For noise resulting from traffic, the averaged loudest-hour noise levels for the No-Action Alternative would increase by 0 to 5 dB(A) versus the existing 2013 condition for most of the noise receptors. This increase would be caused by growth of traffic volumes, including an increase in the number of heavy trucks during the loudest hour projected for the No-Action Alternative.

#### Rail Noise

The future rail operations for the No-Action Alternative reflect the growing number of train occurrences or increasing average length of trains not related to the project alternatives that will be generated by various developments in North Charleston and elsewhere. A number of the existing

noise-sensitive land uses (defined as residences, schools, churches, hospitals, parks, etc.) would be located within the 2038 No-Action Alternative noise contours from the tracks as the result of the general non-project related developments. The 2038 No-Action ambient noise levels in the vicinity of the future tracks are estimated below 60 dB(A) DNL. This estimate is based on the field-measured existing noise levels in the study area as described in Section 3.12 and adjusted for design year 2038.

## Rail Vibration

The ground-borne vibration levels generated by train activities at vibration-sensitive receptors along the existing railroad segments would remain steady for the No-Action Alternative for the 2038 design year. Rail vibration effects are unlikely; however, a single-family residence at 2312 Taylor Street is currently located at a distance of 23 feet from the centerline of the existing Reads Branch track segment at Rivers Avenue, which is very close to the vibration impact threshold distance of 20 feet. Due to this proximity, train activities on the track would potentially generate some vibration effects for the receptor exceeding the vibration impact criterion even under the existing and No-Action conditions.

### 4.17.2.4 Air Quality

The quality of ambient air plays an important role in the health of the public. Exposure to pollutants is associated with numerous effects on human health, including increased respiratory symptoms, hospitalization for heart or lung disease, and even premature death. The USEPA sets NAAQS limits to protect human health. Section 3.13.2 describes each of the criteria air pollutants for which an NAAQS has been established and their known health effects. As stated in Section 3.13 (Air Quality), the Charleston region currently meets all NAAQS, but ozone levels in North Charleston are relatively high due to industrial and mobile sources in the area.

Construction criteria pollutant emissions would be short term. Therefore, impacts resulting from the No Action Alternative construction criteria pollutant emissions would be minor short-term adverse. Criteria pollutant emissions from the No-Action Alternative would equal less than 1 percent of the total criteria pollutants emitted in the study area. Impacts of criteria pollutants from the Operational Inventory of the No-Action Alternative would be minor permanent adverse. Criteria pollutants emitted from the No-Action Alternative, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, the No-Action Alternative would not put the Tri-County area into non-attainment for any NAAQS. Impacts to air quality from the No-Action Alternative on criteria pollutants would be minor permanent adverse. Non-DPM HAP emissions from the No-Action Alternative would each equal less than one-tenth of 1 percent of the total HAPs emitted in the study area. Potential impacts would be acceptable. Potential excess cancer risk would be within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

## Air Quality Human Health Impact Summary

The No-Action Alternative results in a minor impact to human health from air quality impacts.

### 4.17.2.5 Hazardous Materials

As documented in Section 4.15 (HTRW), the No-Action Alternative results in a minor impact from the potential to encounter contaminated soils from 13 known sites. Minor impacts result from excavation activities, exposure to contaminated groundwater from dewatering in excavation areas, demolition of (unknown number of) structures with asbestos and/or metals-based paints, and from potential accidental spills; however, with implementation of BMPs during construction, there is a negligible impact to human health from hazardous waste and materials.

### 4.17.2.6 Community Safety and Emergency Response Times

The No-Action Alternative has the potential for minor adverse impacts to safety and emergency response if new at-grade crossings are constructed to serve the future light industrial and mixed-use facilities. The severity of these impacts would be dependent upon the location of, and delay caused by, any new at-grade crossings; however, overall intensity of impacts to community safety and emergency response from new at-grade rail crossings would be minor if daily average time delays for commuters are similar to those experienced under existing conditions.

Charleston County EMS has adopted the following response time goals for urban/suburban areas:

- Acceptable – Response time less than 8 minutes 80 percent of the time.
- Marginal – Response time between 8 and 15 minutes
- Unacceptable – Response time greater than 15 minutes

### 4.17.2.7 Light and Glare

Light and glare can have a variety of adverse health effects. There is limited to no lighting currently on the project site and River Center project site, and no nighttime port activities. Existing lighting is for security, street illumination (e.g., street lights), and what is required to operate low-level cranes. Future development could increase levels of light and glare above existing conditions; however, this level of light and glare would be consistent with adjacent land uses and likely result in no impact to viewers and/or adjacent residents during nighttime. Therefore there would be no impact from light and glare for the No-Action Alternative.



### 4.17.3 Alternative 1: Proposed Project (CSX – South via Milford / NS – North via Hospital District)

Section 1.7 details the design elements of Alternative 1 (Proposed Project) and operations of the proposed facility. Potential risks to human health and safety during construction and operation of Alternative 1 (Proposed Project) are identified by impact type.

#### 4.17.3.1 Worker Safety

Construction and operation of the ICTF involves features and activities that can expose workers to potential injuries, illnesses, or fatalities; however, the potential risk of injury from project facilities is considered low because of the design features included with the Proposed Project, safety precautions and training measures that would be implemented by the Applicant during construction and operation of the facility, and compliance with safety guidelines. Therefore, there is a negligible impact to worker health and safety by Alternative 1 (Proposed Project).

#### 4.17.3.2 Drinking Water Quality

As identified for the No-Action Alternative, drinking water supply sources for all of North Charleston are located outside of the study area (Bushy Park Reservoir and Edisto River) and would not be impacted by Alternative 1 (Proposed Project) from construction activities or from disturbance of known contaminated groundwater sources. Therefore, there is a negligible impact to human health and safety from drinking water quality impacts by Alternative 1 (Proposed Project).

#### 4.17.3.3 Noise and Vibration

Impacts from traffic, rail (includes horns), construction, and operational noise from the project site under Alternative 1 (Proposed Project) were identified by comparing the increase in noise over No-Action Alternative (existing condition). Impact levels are defined as:

- 0 to 3 dB(A) increase in  $L_{eq(h)}$  is a no or negligible impact;
- 3 to 5 dB(A) increase in  $L_{eq(h)}$  is a minor impact;
- 5 to 10 dB(A) increase in  $L_{eq(h)}$  is a moderate impact;
- Increase in  $L_{eq(h)}$  greater than 10 dB(A) is a major impact.

Following the FTA recommendation, the ground-borne vibration level of 80 VdB from infrequent train passby events typical for the project alternatives is considered the impact criterion for vibration-sensitive land uses such as residences and other buildings where people normally sleep (Category 2). Unlike the relative noise impact criteria that are based on a comparison of the future build alternatives with the No-Action Alternative, the vibration impact criterion is “absolute” in that the vibration impact is likely when a build alternative’s predicted vibration level exceeds the vibration velocity threshold indicated above. Also in contrast to the aggregate  $L_{eq}$  or DNL metrics

used for the noise impact criteria, which combine multiple noise events within a certain time period, the vibration impact criterion applies to individual train passby events.

### **Traffic Noise**

Alternative 1 (Proposed Project) results in a negligible impact from traffic noise when compared to the No-Action alternative.

### **Rail Noise**

The noise contours along the rail segments between Dorchester Road to Misroon Street (existing) (Segments 1, 2, and 3), Hackemann Avenue to Discher Street (existing) (Segment 7), and Avenue B and the ICTF facility (proposed) (Segment 5) would expand considerably under Alternative 1 as compared to the No-Action Alternative. Regarding train and train horn noise, under Alternative 1 (Proposed Project), the number of residences that will have a major impact is 0, moderate impact is 145, and minor impact is 25.

### **Rail Vibration**

Potential rail vibration impacts were evaluated for land uses identified along the selected railway segments and included 76 receptors. These locations can be found in Appendix H. Based on the evaluation, it was determined that receptors located at a distance less than 20 feet from the track centerline would experience rail vibration impacts. Under Alternative 1, none of the receptors are located at a distance less than 20 feet from the track centerline; therefore, rail vibration effects would be unlikely for the 76 receptors analyzed. The ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative.

### **Construction Noise**

The average construction noise levels at the nearest residential land uses (residential receptors located 10 feet away from the foot of the berm) would meet the established criterion of 80 dB(A) during the general demolition/grading phase and the on-site NBIF yard construction phase. For short periods of time over the earthen berm construction (15 days) and pile driving activities (total of 90 days), the average noise levels are expected to exceed the acceptable criterion of 80 dB(A). Construction activities of the predicted noise levels would be clearly audible over the existing ambient noise in the surrounding communities, but may be tolerable due to the interim nature of the disturbance. The earthen berm construction and pile driving activities would be short-term, but still generate minor to moderate noise impacts with potential adverse community reaction.

## Operational Noise

Exterior noise impacts from the Proposed Project operations are determined in comparison with the 2038 No-Action Alternative exterior noise levels for the community adjacent to the site (see Table 4.12-4). The impacts for the nearest receptors (10 feet from the berm) are summarized in Table 4.12-13 for daytime and nighttime conditions. Daytime noise impact (7:00 a.m. to 10:00 p.m.) is most important to consider as this can affect people's activities outside their homes. The exterior noise levels from the ICTF operations would exceed the No-Action ambient noise level in the Chicora-Cherokee Communities during daytime hours by up to 7 dB(A). Such an increase constitutes a moderate noise impact for the residential land uses nearest to the project site (as defined in Table 4.12-5). For the second row of homes along the earthen berm, assuming some shielding from the first row of homes, the daytime noise impact from the ICTF operations could be up to 4 dB(A), which is a minor impact. For the third row of homes, a negligible daytime noise impact below 3 dB(A) would likely be produced due to shielding from both the first and second rows of homes. It is anticipated that negligible daytime noise impacts below 3 dB(A) would be generated by the ICTF operations at distances beyond approximately 180 feet from the earthen berm.

Ambient noise associated with ICTF operations could expose the adjacent residential areas to exterior noise level increases over the No-Action ambient of 14 to 17 dB(A) during nighttime hours (defined as 10:00 p.m. to 7:00 a.m.). When compared to the No-Action ambient, this would equate to a major impact during the nighttime hours to exterior noise levels. However, the nighttime hours are generally associated with sleep. Refer to subsection 4.12.3.5 for information on exterior to interior noise reduction. Interior noise levels are not anticipated to disrupt sleep.

## Noise and Vibration Human Health Impact Summary

Within the study area the composite impacts of noise and vibration would be negligible. However, in localized areas (within close proximity to the ICTF and/or several segments of new track [see Section 4.12]) impacts of exterior noise would be minor to moderate (daytime) and major (nighttime). Refer to subsection 4.12.3.5 for information on exterior to interior noise reduction. Interior noise levels are not anticipated to disrupt sleep. Included as a mitigation measure, the construction of an earthen berm along the western boundary of the project site boundary reduces the number of noise sensitive receivers affected by operational noise from the facility.

### 4.17.3.4 Air Quality

Proposed Project construction criteria pollutant emissions would be short term and spread out over 5 years. Potential impacts to air quality would be minor short-term adverse. Operational criteria pollutant emissions would be less than 1 percent of the study area's criteria pollutant emissions. Potential impacts would be minor permanent adverse. Criteria pollutants emitted from the Proposed Project Alternative, along with the existing and projected criteria pollutants, would not put the Tri-

County area into non-attainment for any criteria pollutants and the NAAQS would remain in compliance. Potential impacts would be minor permanent adverse. Non-DPM HAP emissions from the Proposed Project Alternative would each equal less than one-tenth of 1 percent of the total HAPs emitted in the study area. Potential impacts would be acceptable. Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

### **Air Quality Human Health Impact Summary**

The overall impact to human health and safety from air quality impacts by Alternative 1 (Proposed Project) is minor permanent adverse.

#### **4.17.3.5 Hazardous Materials**

Impacts to Human Health and Safety from hazardous materials by Alternative 1 (Proposed Project) are similar to the No-Action Alternative. A minor impact results from the potential to encounter contaminated soils at 28 known sites. Minor impacts result from excavation activities, exposure to contaminated groundwater from dewatering in excavation areas, and the demolition of approximately 150 structures with asbestos and/or metals-based paints. There is no anticipated involvement with the Macalloy Superfund site. There is potential for minor and/or major impacts from accidental spills on the project site from the use of ASTs (diesel fuels), storage of other minor amounts of solvents on the premises, and from containers containing hazardous materials. However, with implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

#### **4.17.3.6 Community Safety and Emergency Response Times**

Community safety and emergency response impacts associated with Alternative 1 (Proposed Project) are related to the construction of additional at-grade crossings and a notable increase in truck volumes on local streets. Construction of the rail and ROW improvements at Meeting Street for the southern rail connection would result in one new major at-grade rail crossing. This new at-grade rail crossing would have a minor indirect adverse impact to community safety by introducing a new conflict point between trains and automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street at the location of this proposed new at-grade crossing.

This new at-grade crossing may also have a minor adverse impact on emergency response times for certain locations because there is the potential for Meeting Street to be blocked for approximately 11 minutes<sup>49</sup>, four times a day, when the CSX trains are entering and leaving the Navy Base ICTF. Detour routes are available, such as the elevated Stromboli Avenue and Cosgrove-McMillan Overpass, but the detour could increase response times, depending on the location of the emergency. The

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<sup>49</sup> Based on an 8,000-foot train traveling at 10 miles per hour through the crossing.



community of Union Heights might also have a minor adverse impact to emergency response if a train related to Alternative 1 (Proposed Project) was blocking access on both east and west access points as it navigated the U-turn.

In the northern portion of the Navy Base ICTF, the grade separation of Cosgrove Avenue over proposed rail tracks on the project site would preserve east-west mobility for automobiles, bicycles, and pedestrians, and would preserve access to the eastern portion of the northern study area for emergency responders.

During project scoping, the City of Charleston identified its acquirement of approximately 16 acres of land north of Herbert Street for the construction of a new public service operations center for Police, Fire and Public Service. The City of North Charleston identified a concern that the southern rail connection would extend through a portion of the proposed operations center facility affecting the size of the facility and access to/from the property. The City of North Charleston also noted that the emergency access and daily access to the site are critical to their planned operations center to enable the City of North Charleston to provide essential police, fire, and public safety services to residents.

#### 4.17.3.7 Light and Glare

New sources for light and glare associated with Alternative 1 (Proposed Project) include the 85-foot-tall mast lighting that would be illuminated from dusk to dawn, as well as new train activity using the arrival and departure tracks. As per Palmetto Railways' proposed mitigation measures, the lighting on the ICTF would be directed downward and shielded to reduce spill light onto adjacent residential uses, and the photometric design would result in less than 0.5 foot-candles outside of the project site. Analysis of lighting effects on residential structures adjacent to the project site within the Chicora-Cherokee neighborhood indicate that illumination would result in the desired mitigation of light illumination of less than 0.5 foot-candles (Appendix B). As a result of these mitigation measures, the impact intensity from high mast lighting would result in a negligible, permanent adverse impact. Lighting of the ICTF during night time would not be of sufficient illumination as to disturb sleep and other nighttime activities off of the project site.

When trains operate at night, train headlights could shine into residential windows at points where the track turns, primarily affecting structures within the Hospital District (e.g., near McMillan Avenue and St. Johns Avenue). This effect would be similar to the flash of vehicle headlights, although substantially more intense. Residences and other structures within the Hospital District are most likely to be affected by train headlamps at night, with the likelihood of no more than 2 trains at night with full build-out. Only those residences within 800 feet of the direct beam of the trains would be affected, though intervening vegetation, trees, and other structures would help to block the light. Although the effect of train lighting on viewers in locations where the tracks curve could be intense, the effect would be momentary and occur seldom, and few viewers over a minimal geographic area

would be impacted. There would be a minor adverse impact from light and glare as a result of new train activity.

Light from increased truck traffic along the drayage road would not be anticipated to affect adjacent residential uses given the earthen berm wall that would be constructed at the western boundary of the project site.

#### **4.17.4 Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-line)**

Section 2.4 summarizes the design elements of Alternative 2 and operations of the proposed facility. Potential risks to human health and safety during construction and operation of Alternative 2 include:

##### **4.17.4.1 Worker Safety**

Potential risks to worker safety under Alternative 2 are the same as Alternative 1 (Proposed Project). The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

##### **4.17.4.2 Drinking Water Quality**

The impact to human health and safety from drinking water quality impacts under Alternative 2 is the same (negligible) as Alternative 1 (Proposed Project).

##### **4.17.4.3 Noise and Vibration**

Impacts from traffic, rail (includes horns), construction, and operational noise from the project site under Alternative 2 were identified by comparing the increase in noise over the No-Action Alternative (existing condition).

#### **Traffic Noise**

Alternative 2 results in a negligible impact from traffic noise when compared to the No-Action alternative.

#### **Rail Noise**

New build rail segments from O'Hear Avenue to the ICTF facility in the vicinity and south of crossing 19 (Segment 6). These stretches of track would only be built under Alternative 2, and noise from trains would impact eight residences along the first segment and 10 residences along the southern continuation of the rail line parallel to Spruill Avenue. Impacts along these rail segments would be moderate to major. It should be noted that land uses in closer proximity to the track path may need

to be demolished in order to construct the track. Regarding train and train horn noise, under Alternative 2, the number of residences that will have a major impact is 4, moderate impact is 133, and minor impact is 25.

### **Rail Vibration**

Under Alternative 2, impacts from ground-borne vibration generated by train activities would be similar to Alternative 1 (Proposed Project).

### **Construction Noise**

Noise conditions related to the ICTF construction activities under Alternative 2 are the same as the ones estimated under Alternative 1.

### **Operational Noise**

Noise impacts from the project site operations under Alternative 2 are the same as the ones estimated for Alternative 1.

### **Noise and Vibration Health Impact Summary**

Alternative 2 has similar impact to Alternative 1 (Proposed Project).

#### **4.17.4.4 Air Quality**

Impacts to Air Quality by Alternative 2 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project). Criteria pollutant emissions and impacts from operational activities would be the same as Alternative 1 (Proposed Project). Criteria pollutants emitted from the operation of Alternative 2, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, Alternative 2 would not put the Tri-County area into non-attainment for any criteria pollutants. Impacts to air quality from the operation of Alternative 2 on criteria pollutants would be minor. Non-DPM HAPs emissions from operational activities and impacts would be the same as Alternative 1 (Proposed Project). Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

### **Air Quality Human Health Impact Summary**

The overall impact to human health and safety from air quality impacts by Alternative 2 is similar to Alternative 1 (Proposed Project), minor permanent adverse.



#### 4.17.4.5 Hazardous Materials

Impacts to Human Health and Safety from hazardous materials by Alternative 2 are similar to Alternative 1 (Proposed Project), except there are 30 fewer buildings that would be demolished reducing the potential to encounter asbestos and/or metals-based paints and only 27 known sites to encounter contaminated soils. However, with implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

#### 4.17.4.6 Community Safety and Emergency Response Times

Impacts to community safety and emergency response under Alternative 2 would be similar to those under Alternative 1 (Proposed Project), however there are several differences. In Alternative 2, the northern rail connection for NS would be relocated along Spruill Avenue within existing CSX ROW to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line. As a result of the rail alignment, a cul-de-sac would be constructed at the southern end of St. Johns Avenue. The former Charleston Naval Complex gate at Turnbull Avenue will be reopened to provide future access between St. Johns Avenue and Noisette Boulevard. Same as Alternative 1 (Proposed Project), Alternative 2 creates a new at-grade rail crossing at the intersection of Meeting Street and Herbert Street and at O'Hear Avenue south of Bexley Street.

Alternative 2 results in a minor adverse impact to human health from delay to emergency response times for the same reasons as Alternative 1 (Proposed Project).

#### 4.17.4.7 Light and Glare

The overall impact to human health and safety from light and glare by Alternative 2 is similar to Alternative 1 (Proposed Project).

### 4.17.5 Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital)

Section 2.4 summarizes the design elements of Alternative 3 and operations of the proposed facility. Potential risks to human health and safety during construction and operation of Alternative 3 include:

#### 4.17.5.1 Worker Safety

Potential risks to worker safety under Alternative 3 are the same as Alternative 1 (Proposed Project). The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

#### 4.17.5.2 Drinking Water Quality

The impact to human health and safety from drinking water quality impacts under Alternative 3 is the same (negligible) as Alternative 1 (Proposed Project).

#### 4.17.5.3 Noise and Vibration

Impacts from traffic, rail (includes horns), construction, and operational noise from the project site under Alternative 3 were identified by comparing the increase in noise over the No-Action Alternative (existing condition).

##### Traffic Noise

Alternative 3 results in a negligible impact from traffic noise when compared to the No-Action alternative.

##### Rail Noise

A new build rail segment from Meeting Street to Spruill Avenue in the vicinity of crossing 20 (Segment 8) would be built under Alternative 3, and noise from trains would impact 10 noise sensitive receivers along the segment. The noise impact for these receivers would be minor to moderate. Land uses in closer proximity to the track path may be demolished in the construction of the rail track for this alternative. Under Alternative 3, the proposed rail configuration between Avenue B and the ICTF facility (Segment 5) is identical to the Alternative 1 alignment and would impact the same receivers including a school and a church. A moderate noise impact is estimated for these land uses. Regarding train and train horn noise, under Alternative 3, the number of residences that will have a major impact is 0, moderate impact is 149, and minor impact is 28.

##### Rail Vibration

Under Alternative 3, impacts from ground-borne vibration generated by train activities would be similar to Alternative 1 (Proposed Project).

##### Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 3 are the same as the ones estimated under Alternative 1.

##### Operational Noise

Noise impacts from the project site operations under Alternative 3 are the same as the ones estimated for Alternative 1.

## Noise and Vibration Health Impact Summary

Alternative 3 has similar impact to Alternative 1 (Proposed Project).

### 4.17.5.4 Air Quality

Impacts to Air Quality by Alternative 3 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project). Criteria pollutant emissions and impacts from operational activities would be the same as Alternative 1 (Proposed Project). Criteria pollutants emitted from the operation of Alternative 3, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, Alternative 3 would not put the Tri-County area into non-attainment for any criteria pollutants. Impacts to air quality from the operation of Alternative 3 on criteria pollutants would be minor. Non-DPM HAPs emissions from operational activities and impacts would be the same as Alternative 1 (Proposed Project). Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

## Air Quality Human Health Impact Summary

The overall impact to human health and safety from air quality impacts by Alternative 3 is similar to Alternative 1 (Proposed Project), minor permanent adverse.

### 4.17.5.5 Hazardous Materials

Impacts to Human Health and Safety from hazardous materials by Alternative 3 are similar to Alternative 1 (Proposed Project), except there are 10 fewer buildings that would be demolished reducing the potential to encounter asbestos and/or metals-based paints and only 15 known sites to encounter contaminated soils. However, with implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

### 4.17.5.6 Community Safety and Emergency Response Times

Impacts to community safety and emergency response under Alternative 3 would be similar to those under Alternative 1 (Proposed Project), however there are several differences. The southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW), therefore the existing at-grade crossings of Pittsburgh Avenue and Discher Street would not be impacted with ICTF train occurrences and the new at-grade crossing of Meeting Street at Herbert Street would not be created for Alternative 3. Alternative 3 would create at-grade crossings, of both Meeting Street and Spruill Avenue near Kingsworth Avenue.

The new at-grade rail crossings would have a minor indirect adverse impact to community safety by introducing new conflict points between trains and automobiles, bicycles, and pedestrians. There are



existing bike lanes and sidewalks along Meeting Street and Spruill Avenue at the location of these proposed new at-grade crossings.

These new at-grade crossings may also have a moderate adverse impact on emergency response times for certain locations because there is the potential for Meeting Street and Spruill Avenue to be blocked for approximately 11 minutes<sup>50</sup>, four times a day, when the CSX trains are entering and leaving the Navy Base ICTF. Detour routes are available such as the elevated Stromboli Avenue and Cosgrove-McMillan Overpass, but the detour could increase response times, depending on the location of the emergency. The community of Union Heights, Windsor, and Howard Heights might also have a moderate adverse impact to emergency response if a train related to the Alternative 3 was blocking access on both east and west access points as it navigated the U-turn.

#### **4.17.5.7 Light and Glare**

The overall impact to human health and safety from light and glare by Alternative 3 is similar to Alternative 1 (Proposed Project).

### **4.17.6 Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

Section 2.4 summarizes the design elements of Alternative 4 and operations of the proposed facility. Potential risks to human health and safety during construction and operation of Alternative 4 include:

#### **4.17.6.1 Worker Safety**

Potential risks to worker safety under Alternative 4 are the same as Alternative 1 (Proposed Project). The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

#### **4.17.6.2 Drinking Water Quality**

The impact to human health and safety from drinking water quality impacts under Alternative 4 is the same (negligible) as Alternative 1 (Proposed Project).

#### **4.17.6.3 Noise and Vibration**

Impacts from traffic, rail (includes horns), construction, and operational noise from the project site under Alternative 4 were identified by comparing the increase in noise over the No-Action Alternative (existing condition).

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<sup>50</sup> Based on an 8,000-foot train traveling at 10 miles per hour through the crossing.

## Traffic Noise

Alternative 4 results in a negligible impact from traffic noise when compared to the No-Action alternative.

## Rail Noise

Under Alternative 4, the noise contours along the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) and from Hackemann Avenue to Discher Street (Segment 7) would be significantly expanded in comparison to the No-Action Alternative. Regarding train and train horn noise, under Alternative 3, the number of residences that will have a major impact is 0, moderate impact is 209, and minor impact is 70.

## Rail Vibration

Under Alternative 4, impacts from ground-borne vibration generated by train activities would be similar to Alternative 1 (Proposed Project).

## Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 4 are the same as the ones estimated under Alternative 1.

## Operational Noise

Noise impacts from the project site operations under Alternative 4 are the same as the ones estimated for Alternative 1.

## Noise and Vibration Health Impact Summary

Alternative 4 has similar impact to Alternative 1 (Proposed Project).

### 4.17.6.4 Air Quality

Impacts to Air Quality by Alternative 4 construction criteria pollutant emissions would be similar to Alternative 1 (Proposed Project). Criteria pollutant emissions and impacts from operational activities would be the same as Alternative 1 (Proposed Project). Criteria pollutants emitted from the operation of Alternative 4, along with the existing and projected criteria pollutants, would not exceed the applicable NAAQS; therefore, Alternative 4 would not put the Tri-County area into non-attainment for any criteria pollutants. Impacts to air quality from the operation of Alternative 4 on criteria pollutants would be minor. Non-DPM HAPs emissions from operational activities and impacts would be the same as Alternative 1 (Proposed Project). Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

## Air Quality Human Health Impact Summary

The overall impact to human health and safety from air quality impacts by Alternative 4 is similar to Alternative 1 (Proposed Project), minor permanent adverse.

### 4.17.6.5 Hazardous Materials

Impacts to Human Health and Safety from hazardous materials by Alternative 4 are similar to Alternative 1 (Proposed Project). However, with implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

### 4.17.6.6 Community Safety and Emergency Response Times

Impacts to community safety and emergency response under Alternative 4 would be the similar to those under Alternative 1 (Proposed Project), however there are several differences. Alternative 4 is a variation of Alternative 1 (Proposed Project) where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection, with NS connecting to an existing NS rail line near Milford Street (and adjacent to existing CSX rail and ROW). Proposed rail through the Hospital District would stop short of Noisette Creek.

In Alternative 4 both CSX and NS would use the southern rail alignment to Milford Street. Since NS would not use the Alternative 1 (Proposed Project) northern alignment, Alternative 4 would not impact the at-grade crossings of Rivers Avenue, Virginia Avenue and Avenue B. Alternative 4 would have twice as many ICTF train occurrences than Alternative 1 (Proposed Project), eight per day, at the at-grade crossings along the southern alignment. The community of Union Heights might also have a moderate adverse impact to emergency response if a train related to the Alternative 1 (Proposed Project) was blocking access on both east and west access points as it navigated the U-turn.

### 4.17.6.7 Light and Glare

The overall impact to human health and safety from light and glare by Alternative 4 is similar to Alternative 1 (Proposed Project).

## 4.17.7 Alternative 5: River Center Site (CSX – South via Milford / NS – North via Hospital District)

Section 2.4 summarizes the design elements of Alternative 5 and operations of the proposed facility on the River Center Site. Potential risks to human health and safety during construction and operation of Alternative 5 include:

#### **4.17.7.1 Worker Safety**

Potential risks to worker safety under Alternative 5 are the same as Alternative 1 (Proposed Project). The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

#### **4.17.7.2 Drinking Water Quality**

The impact to human health and safety from drinking water quality impacts under Alternative 5 is the same (negligible) as Alternative 1 (Proposed Project).

#### **4.17.7.3 Noise and Vibration**

Impacts from traffic, rail (includes horns), construction, and operational noise from the project site under Alternative 5 were identified by comparing the increase in noise over the No-Action Alternative (existing condition).

##### **Traffic Noise**

Alternative 5 results in a minor to moderate impact to 18 receptors in the Chicora-Cherokee community exposed to traffic noise from the proposed drayage road from the River Center project site through the Proposed Project site.

##### **Rail Noise**

Under Alternative 5, operations on the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3), Hackemann Avenue to Discher Street (Segment 7), and Pittsburg Avenue to the ICTF facility (Segment 10), north of crossing 17 would increase in comparison to the No-Action Alternative, similar to Alternative 1. Regarding train and train horn noise, under Alternative 5, the number of residences that will have a major impact is 0, moderate impact is 142, and minor impact is 25.

##### **Rail Vibration**

Under Alternative 5, the ground-borne vibration generated by train activities would produce no or negligible impact for the vibration-sensitive receptors along the railroad segments in the study area in comparison with the 2038 No-Action Alternative. Rail vibration effects would be unlikely for the 76 receptors analyzed.

##### **Construction Noise**

For Alternative 5, the average construction noise levels at the nearest residential land uses would meet the established criterion of 80 dB(A) during the general demolition/grading phase and the on-site NBIF yard construction phase. For short periods of time over the noise wall construction and



other pile driving activities, the average noise levels are expected to exceed the accepted criterion and produce a minor to moderate short-term adverse impact. Construction activities would be clearly audible over the existing ambient noise in the community, but may be tolerable due to the interim nature of the disturbance. The pile driving activities would be short-term.

### Operational Noise

Noise impacts from the River Center operations are based on exterior levels and determined in comparison with the 2038 No-Action Alternative noise levels for the community adjacent to the site (see Table 4.12-4). The impacts for the nearest receptors are summarized in Table 4.12-21 for daytime and nighttime conditions. Daytime noise impact (7:00 a.m. to 10:00 p.m.) is most important to consider as this can affect people's activities outside their homes. The exterior noise levels from the ICTF operations would exceed the daytime No-Action ambient noise level at the edge of the CNYOQ Historic District during daytime hours by up to 2 dB(A), which is a negligible impact (as defined in Table 4.12-5). Loud operations like rail car coupling would be audible at the nearest residences but, in general, operational noise levels would remain comparable to the ambient noise. Homes east of Manley Avenue and beyond are also expected to experience negligible or no noise impact from daytime ICTF operations due to increased distance and shielding effect from other homes.

Ambient noise associated with ICTF operations could expose the adjacent residential areas to exterior noise level increases over the No-Action ambient of 9 to 12 dB(A) during nighttime hours (defined as 10:00 p.m. to 7:00 a.m.). When compared to the No Action ambient, this would equate to a moderate to major impact during the nighttime hours to exterior noise levels. However, the nighttime hours are generally associated with sleep. Refer to subsection 4.12.7.5 for information on exterior to interior noise reduction. Interior noise levels are not anticipated to disrupt sleep.

### Noise and Vibration Health Impact Summary

Within the study area the composite impacts of noise and vibration would be negligible. However, in localized areas (within close proximity to the River Center project site and/or several segments of track (see Section 4.12)) impacts of noise would be minor to moderate (daytime) and major (nighttime). Refer to subsection 4.12.7.5 for information on exterior to interior noise reduction. Interior noise levels are not anticipated to disrupt sleep. Included as a mitigation measure, the construction of a noise wall along the eastern boundary of the River Center project site boundary reduces the number of noise sensitive receivers affected by operational noise from the facility.

#### 4.17.7.4 Air Quality

Under Alternative 5, construction criteria pollutant emissions would be short term and spread out over five years. Potential impacts to air quality would be minor short-term adverse. Operational criteria pollutant emissions would be less than 1 percent of study area's criteria pollutant emissions.

Potential impacts would be minor permanent adverse. Criteria pollutants emitted from Alternative 5, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO<sub>2</sub> 1 hour NAAQS. Potential impacts would be major adverse. Non-DPM HAP emissions from the Proposed Project Alternative would each equal less than one-tenth of 1 percent of the total HAPs emitted in the study area. Potential impacts would be acceptable. Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

### **Air Quality Human Health Impact Summary**

Under Alternative 5, the Tri-County area would be in non-attainment for NO<sub>2</sub>. This and other air quality impacts results in a major permanent adverse impact to human health and safety.

#### **4.17.7.5 Hazardous Materials**

Impacts to Human Health and Safety from hazardous materials by Alternative 5 are similar to Alternative 1 (Proposed Project), except there are 82 fewer buildings that would be demolished reducing the potential to encounter asbestos and/or metals-based paints and only 20 known sites to encounter contaminated soils. However, with implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

#### **4.17.7.6 Community Safety and Emergency Response Times**

Alternative 5 is a variation of Alternative 1 (Proposed Project) with the project site being moved to the River Center Site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the new site. The primary roadway network change would be the elimination of the McMillan Avenue/ Cosgrove Avenue Realignment in Alternative 5. Same as Alternative 1 (Proposed Project), Alternative 5 would create a new at-grade rail crossing at the intersection of Meeting Street and Herbert Street. Traffic patterns around the proposed ICTF at River Center change compared to the No-Action Alternative due to the ICTF and modifications to the roadway network. McMillan Avenue and Reynolds Avenue would no longer provide a connection from Spruill Avenue to Noisette Boulevard. Cosgrove Avenue east of Spruill Avenue would only provide access to the River Center project site. The closest EMS station is located on Dorchester Road west of the DCIA. Emergency responders coming from the west side of the DCIA would have to go north of Noisette Creek then east to connect to Noisette Boulevard to access properties along the Cooper River. Emergency responders dispatching from Fire Station 2 on the corner of Carner Avenue and Clement Avenue would have to travel south to the future Stromboli Avenue Bridge over rail tracks then north on the improved Bainbridge Avenue to access properties. The City of Charleston's planned public service operation center is similarly impacted by the southern connection for Alternative 5. In addition, the construction of the drayage road from the River Center project site for Alternative 5 limits east-west

mobility throughout the study area. Therefore, Alternative 5 results in a minor impact to human health from delay to emergency response times for the same reasons as Alternative 1 (Proposed Project).

Similar to Alternative 1 (Proposed Project), construction of the rail and ROW improvements at Meeting Street for the southern rail connection would result in one new major at-grade rail crossing. This new at-grade rail crossing would have a potential minor, indirect adverse impact to community safety by introducing a new conflict point between trains and automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street at the location of this proposed new at-grade crossing.

Similar to Alternative 1, there would be the potential for Meeting Street to be blocked by a train for approximately 11 minutes<sup>51</sup>, four times a day when the CSX trains are entering and leaving the River Center ICTF. The CARTA Superstop is located at the corner of Cosgrove Avenue and Rivers Avenue. Alternative 5 would result in a high volume of trucks (2,161 trucks per day in 2018) traveling on Cosgrove Avenue to access the ICTF. These trucks could pose a safety concern to pedestrians walking to and from the buses.

#### **4.17.7.7 Light and Glare**

Under Alternative 5, light and glare impacts resulting from the high-mast lights on the ICTF would be the same as Alternative 1 (Proposed Project), which resulted in a negligible, permanent adverse impact. Nighttime train activity would result in a negligible impact as there would be few curvatures on the southern route to Milford Street where residences would be affected, including the Chicora-Cherokee neighborhood.

### **4.17.8 Alternative 6: River Center Site (CSX – South via Kingsworth / NS – North via Hospital)**

Section 2.4 summarizes the design elements of Alternative 6 and operations of the proposed facility on the River Center Site. Potential risks to human health and safety during construction and operation of Alternative 6 include:

#### **4.17.8.1 Worker Safety**

Potential risks to worker safety under Alternative 5 are the same as Alternative 1 (Proposed Project). The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

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<sup>51</sup> Based on an 8,000-foot train traveling at 5 miles per hour through the crossing.

#### 4.17.8.2 Drinking Water Quality

The impact to human health and safety from drinking water quality impacts under Alternative 6 is the same (negligible) as Alternative 1 (Proposed Project).

#### 4.17.8.3 Noise and Vibration

Impacts from traffic, rail (includes horns), construction, and operational noise from the Proposed Project site under Alternative 5 were identified by comparing the increase in noise over the No-Action Alternative (existing condition).

##### Traffic Noise

Alternative 6 results in a negligible impact from traffic noise when compared to the No-Action alternative.

##### Rail Noise

Under Alternative 6, the noise contours along the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) and from Hackemann Avenue to Discher Street (Segment 7), would be significantly expanded in comparison to the No-Action Alternative. A proposed rail segment from Meeting Street to Spruill Avenue in the vicinity of crossing 20 (Segment 8) would be built under Alternative 6, and noise from trains would impact 10 noise sensitive receivers along the segment. Land uses in closer proximity to the track path may be demolished for construction of the proposed rail track. The proposed new rail segment between Spruill Avenue and the ICTF facility (Segment 9) would impact 23 noise sensitive receivers in the Chicora-Cherokee communities. Regarding train and train horn noise, under Alternative 6, the number of residences that will have a major impact is 0, moderate impact is 146, and minor impact is 28.

##### Rail Vibration

Under Alternative 6, impacts from ground-borne vibration generated by train activities would be similar to Alternative 5.

##### Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 6 are the same as the ones estimated under Alternative 5

##### Operational Noise

Noise impacts from the Proposed Project site operations under Alternative 6 are the same as the ones estimated for Alternative 5.



## Noise and Vibration Health Impact Summary

Alternative 6 has similar impact to Alternative 5.

### 4.17.8.4 Air Quality

Impacts to Air Quality by Alternative 6 construction criteria pollutant emissions would be similar to Alternative 5. Criteria pollutant emissions and impacts from operational activities would be the same as Alternative 5. Criteria pollutants emitted from Alternative 6, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO<sub>2</sub> 1 hour NAAQS. Potential impacts would be major adverse. Non-DPM HAPs emissions from operational activities and impacts would be the same as Alternative 5 (Proposed Project). Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

### Air Quality Human Health Impact Summary

The overall impact to human health and safety from air quality impacts by Alternative 6 is major permanent adverse.

### 4.17.8.5 Hazardous Materials

Impacts to Human Health and Safety from hazardous materials by Alternative 6 are similar to Alternative 5, except there are 10 fewer buildings that would be demolished reducing the potential to encounter asbestos and/or metals-based paints and only 8 known sites to encounter contaminated soils. However, with implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

### 4.17.8.6 Community Safety and Emergency Response Times

Impacts to community safety and emergency response under Alternative 6 would be similar to those under Alternative 5, however there are differences. The southern rail connection for CSX would connect to an existing CSX rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW), therefore the existing at-grade crossings of Pittsburgh Avenue and Discher Street would not be impacted with ICTF train occurrences and the new at-grade crossing of Meeting Street at Herbert Street would not be created for Alternative 6. Alternative 6 would create at-grade crossings of both Meeting Street and Spruill Avenue near Kingsworth Avenue.

The new at-grade rail crossings would have a minor indirect adverse impact to community safety by introducing new conflict points between trains and automobiles, bicycles, and pedestrians. There are existing bike lanes and sidewalks along Meeting Street and Spruill Avenue at the location of these proposed new at-grade crossings.

These new at-grade crossings may also have a moderate adverse impact on emergency response times for certain locations because there is the potential for Meeting Street and Spruill Avenue to be blocked for approximately 11 minutes<sup>52</sup>, four times a day, when the CSX trains are entering and leaving the Navy Base ICTF. Detour routes are available such as the elevated Stromboli Avenue and Cosgrove-McMillan Overpass, but the detour could increase response times, depending on the location of the emergency. The community of Union Heights, Windsor, and Howard Heights might also have a moderate adverse impact to emergency response if a train related to the Alternative 6 was blocking access on both east and west access points as it navigated the U-turn.

The City of Charleston's planned public service operation center would not be impacted by Alternative 6.

#### **4.17.8.7 Light and Glare**

The overall impact to human health and safety from light and glare by Alternative 6 is similar to Alternative 5.

#### **4.17.9 Alternative 7: River Center Site (CSX & NS – South via Milford)**

Section 2.4 summarizes the design elements of Alternative 6 and operations of the proposed facility on the River Center Site. Potential risks to human health and safety during construction and operation of Alternative 7 include:

##### **4.17.9.1 Worker Safety**

Potential risks to worker safety under Alternative 5 are the same as Alternative 1 (Proposed Project). The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

##### **4.17.9.2 Drinking Water Quality**

The impact to human health and safety from drinking water quality impacts under Alternative 7 is the same (negligible) as Alternative 1 (Proposed Project).

##### **4.17.9.3 Noise and Vibration**

Impacts from traffic, rail (includes horns), construction, and operational noise from the Proposed Project site under Alternative 7 were identified by comparing the increase in noise over the No-Action Alternative (existing condition).

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<sup>52</sup> Based on an 8,000-foot train traveling at 10 miles per hour through the crossing.

## Traffic Noise

Alternative 7 results in a negligible impact from traffic noise when compared to the No-Action alternative.

## Rail Noise

Under Alternative 7, the noise contours along the rail segment from north of Dorchester Road to Misroon Street (Segments 1, 2 and 3) and from Hackemann Avenue to Discher Street (Segment 7), would be significantly expanded in comparison to the No-Action Alternative. A new build rail segment from Pittsburg Avenue to the ICTF facility at the River Center project site (Segment 10) would only be built for the southern alignment under Alternative 7. Regarding train and train horn noise, under Alternative 7, the number of residences that will have a major impact is 0, moderate impact is 268, and minor impact is 80.

## Rail Vibration

Under Alternative 7, impacts from ground-borne vibration generated by train activities would be similar to Alternative 5.

## Construction Noise

Noise conditions related to the ICTF construction activities under Alternative 7 are the same as the ones estimated under Alternative 5

## Operational Noise

Noise impacts from the Proposed Project site operations under Alternative 7 are the same as the ones estimated for Alternative 5.

## Noise and Vibration Health Impact Summary

Alternative 7 has similar impact to Alternative 5.

### 4.17.9.4 Air Quality

Impacts to Air Quality by Alternative 7 construction criteria pollutant emissions would be similar to Alternative 5. Criteria pollutant emissions and impacts from operational activities would be the same as Alternative 5. Criteria pollutants emitted from Alternative 7, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO<sub>2</sub> 1 hour NAAQS. Potential impacts would be major adverse. Non-DPM HAPs emissions from operational activities and impacts would be the same as Alternative 5 (Proposed Project). Potential excess cancer risk would fall within the acceptable range. Impacts from cancer risk would be acceptable. The maximum noncancer hazard would be below 1. Potential impacts from noncancer hazard would be negligible.

## Air Quality Human Health Impact Summary

The overall impact to human health and safety from air quality impacts by Alternative 7 is major permanent adverse.

### 4.17.9.5 Hazardous Materials

Impacts to Human Health and Safety from hazardous materials by Alternative 7 are similar to Alternative 5. With implementation of BMPs during construction there is a negligible impact to human health from hazardous waste and materials.

### 4.17.9.6 Community Safety and Emergency Response Times

Impacts to community safety and emergency response under Alternative 7 would be the similar to those under Alternative 5, however there are several differences. Alternative is a variation of Alternative 5 where NS, like CSX, would also enter and exit the Navy Base ICTF from a southern rail connection, with NS connecting to an existing NS rail line near Milford Street (and adjacent to existing CSX rail and ROW). Proposed rail through the Hospital District would stop short of Noisette Creek.

In Alternative 7 both CSX and NS would use the southern rail alignment to Milford Street. Alternative 7 would have twice as many ICTF train occurrences than Alternative 5, eight per day, at the at-grade crossings along the southern alignment. The community of Union Heights might also have a moderate adverse impact to emergency response if a train related to Alternative 5 was blocking access on both east and west access points as it navigated the U-turn. In addition, the construction of the drayage road from the River Center project site for Alternative 7 limits east-west mobility throughout the study area.

Alternative 7 results in a minor impact to human health from delay to emergency response times for the same reasons as Alternative 1 (Proposed Project).

### 4.17.9.7 Light and Glare

The overall impact to human health and safety from light and glare by Alternative 7 is similar to Alternative 5.

### 4.17.10 Related Activities

Section 2.4 summarizes the Related Activities associated with the action alternatives. Potential risks to human health and safety during construction and operation of Related Activities include:



#### **4.17.10.1 Worker Safety**

Potential risks to worker safety from Related Activity are similar to all of the action alternatives. The impact to worker health and safety is negligible for the same reasons identified for Alternative 1 (Proposed Project).

#### **4.17.10.2 Drinking Water Quality**

The impact to human health and safety from drinking water quality impacts under the Related Activities is negligible.

#### **4.17.10.3 Noise and Vibration**

There is a negligible impact to Human Health and Safety by Related Activities from rail noise. The increase in rail noise would be barely perceptible when compared to existing condition.

#### **4.17.10.4 Air Quality**

There is a minor impact to Human Health and Safety from air quality impacts by Related Activities from operational emissions.

#### **4.17.10.5 Hazardous Materials**

There is a minor to major impact to Human Health and Safety from Related Activities from potential accidental spills on the rail tracks. However, with implementation of BMPs during construction and operation there is a negligible impact to human health from hazardous waste and materials.

#### **4.17.10.6 Community Safety and Emergency Response Times**

Minor impact from delay at at-grade crossings from increased rail traffic.

#### **4.17.10.7 Light and Glare**

The overall impact to human health and safety from light and glare is negligible.

#### **4.17.11 Summary of Impacts Table**

Table 4.17-2 summarizes the environmental consequences to human health and safety from the Proposed Project and all of the alternatives.

Table 4.17-2  
Summary of Impacts, Human Health and Safety

Direct Health Impacts from Individual Sources Summary							
Alternative	Worker Safety	Drinking Water Quality	Noise and Vibration	Air Quality	Hazardous Materials	Community Safety and Emergency Response Times	Light and Glare
<b>No-Action</b>	Negligible impact.	Negligible impact to drinking water supply as drinking sources are located outside of the study area.	No impact	Minor impact from air quality	Negligible impact from hazardous materials due to implementation of BMPs during construction.	Potentially minor impact as delay from any new at-grade crossings would be same	No impact from light and glare.
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	Negligible impact resulting from design features of the Proposed Project, safety precautions and training measures, and compliance with safety guidelines.	Negligible impact to water supply as drinking sources are located outside of the study area	Negligible impact from traffic noise and vibration; minor to moderate impact (several areas) from rail noise, construction noise (short-term), and operational noise (daytime).	Minor impact from air quality as the Tri-County area in attainment for criteria pollutants and the NAAQS would remain in compliance.  Potential impacts from non-DPM HAP emissions would be acceptable. Potential excess cancer risk and cancer risk would be acceptable. Potential impacts from noncancer hazard would be negligible.	Negligible impact from hazardous materials due to implementation of BMPs during construction.	Localized minor adverse impact on emergency response times and minor indirect adverse impact to community safety.	Negligible effect from high mast lighting, minor, permanent adverse impact from light and glare associated with nighttime train head lamps to residential structures along curvatures of the track.
<b>2: CSX – Milford / NS – S-line</b>	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).

Direct Health Impacts from Individual Sources Summary							
Alternative	Worker Safety	Drinking Water Quality	Noise and Vibration	Air Quality	Hazardous Materials	Community Safety and Emergency Response Times	Light and Glare
<b>3: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project) with localized moderate impacts to emergency response.	Similar to Alternative 1 (Proposed Project).
<b>4: CSX &amp; NS – Milford</b>	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project).	Similar to Alternative 1 (Proposed Project) with localized moderate impacts to emergency response.	Similar to Alternative 1 (Proposed Project).
<b>5: River Center Site: CSX – Milford / NS – North via Hospital District</b>	Same as Alternative 1 (Proposed Project).	Same as Alternative 1 (Proposed Project).	Negligible impact from operational noise (daytime) and vibration; minor to moderate impact (several areas) from traffic noise, rail noise, and construction noise (short-term).	Major impact to air quality as the Tri-County area would be in non-attainment for NO <sub>2</sub> . Potential impacts from non-DPM HAP emissions would be acceptable. Potential excess cancer risk and cancer risk would be acceptable. Potential impacts from noncancer hazard would be negligible.	Negligible impact from hazardous materials due to implementation of BMPs during construction.	Minor impact to emergency response times and community safety due to additional at-grade rail crossing and limited mobility with construction of River Center site and drayage road.	Negligible effect from high mast lighting and negligible effect from nighttime train head lamps due to lack of curvatures (and affected residences) on the southern arrival/departure tracks.
<b>6: River Center Site: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5 with localized moderate impacts to emergency response.	Similar to Alternative 5.

Direct Health Impacts from Individual Sources Summary							
Alternative	Worker Safety	Drinking Water Quality	Noise and Vibration	Air Quality	Hazardous Materials	Community Safety and Emergency Response Times	Light and Glare
<b>7: River Center Site: CSX &amp; NS – Milford</b>	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5.	Similar to Alternative 5 with localized moderate impacts to emergency response.	Similar to Alternative 5.



## 4.17.12 Mitigation

### 4.17.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Provide around-the-clock security through a combination of security fencing, video cameras, and other security measures. (Minimization)
- Develop detailed pollution prevention plans and implement BMPs to minimize the potential for spills. (Minimization)
- Conduct construction and operations in accordance with appropriate regulations, permits, best practices, and codes. (Minimization)
- Placement of a noise abatement wall, and other Proposed Project features that minimize noise, visual, and air quality impacts to adjacent communities. (Minimization)
- Construct a semi-automated facility that minimize air quality emissions during operations as a result of increased efficiencies during the handling and processing of containers. (Minimization)
- Employ the use of automated switches to eliminate the need for train crews to get out of trains to manually throw switches and thus enhancing the safety of railroad workers. (Minimization)
- Use of inter-box connector (IBC) carts to provide enhanced safety for railroad workers by avoiding slip, trip, and fall incidents while accessing railcars to (un)lock IBCs on containers. (Minimization)
- Employ the use of an automated gate system to eliminate the need for railroad workers to complete inbound, container and chassis damage inspections by walking in a congested gate area thus enhancing safety of railroad workers. (Minimization)

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to Human Health and Safety is also provided in Chapter 6.

### 4.17.12.2 Additional Potential Mitigation Measures

No additional mitigation measures have been recommended by the Corps.

## 4.18 SECTION 4(F) AND 6(F) RESOURCES

### 4.18.1 Methods and Impact Definitions

As described in Chapter 2 (Development and Description of Alternatives), numerous alternatives to the Proposed Project were considered, and after a step-wise screening process, a reasonable range of alternatives was identified for further evaluation under the EIS. This section identifies and evaluates the uses of Section 4(f) and Section 6(f) properties that would result from the Proposed Project and/or the project alternatives. Uses can be either direct uses such as incorporation of property or adverse effects to a Section 106 historic property, or indirect uses (constructive) such as ancillary noise and vibration impacts. A constructive use can occur when a transportation project does not incorporate land from a Section 4(f) resource, but the project's effects on the surrounding area are so severe that the protected activities, features, or attributes that qualify the resources for protection under Section 4(f) are substantially impaired. Substantial impairment is determined to occur when there is a substantial diminishment of the activities, features, and attributes of the Section 4(f) recreation resources.

As discussed in Section 4.10 (Cultural Resources), the Corps is consulting with the SHPO regarding potential Adverse Effects to historic properties that would result from implementation of the Proposed Project and the project alternatives. The FRA cannot approve an alternative that uses a 4(f) property unless it can be demonstrated there is no feasible and prudent avoidance alternative, and the project includes all measures to minimize harm. For this analysis, every action alternative is considered to be "feasible" per the requirement set forth by the FRA, which is that an alternative can be built based on sound engineering judgment. Additionally, every action alternative is initially considered to be "prudent" per the criteria set forth in Section 3.18 (Section 4[f] and 6[f] Resources).

This EIS provides the mechanism for the Corps to evaluate each alternative and determine which alternative, including the Proposed Project, would be the Least Environmentally Damaging Practicable Alternative (LEDPA). The Corps may only issue a DA permit for the LEDPA, and this decision would be documented in the Record of Decision. The determination by FRA/USACE on the effects to 106 properties (with SHPO concurrence), and the Corps' decision on the LEDPA, will inform the FRA's 4(f) analysis.

It is possible that the LEDPA could result in the use of a Section 4(f) resource while another "feasible" alternative would not result in a use. Under such a circumstance, the other "feasible" alternative would be evaluated based on the six conditions that determine whether an alternative is "prudent." In this particular scenario; however, the "feasible" alternative would meet five of the six conditions, with the exception being "(5) other unique problems or unusual factors." Because the Corps can only permit the LEDPA, then the "feasible" alternative that does not use a Section 4(f) resource is, by default, not available for implementation because the Corps would not issue a permit for it. As such,

the other “feasible” alternative would not be a “prudent” alternative based on “other unique problems or unusual factors.”

Identified Section 4(f) and 6(f) resources in the study area were evaluated through literature review (NPS 2014) and investigations conducted as part of the Cultural Resources Survey (Appendix G). The study area contains two parks that are considered 4(f) resources (Riverfront Park and Chicora-Cherokee Community Park), a single park that is considered both a 4(f) and a 6(f) resource (Park South), and 11 historic properties that are considered 4(f) resources.

Determinations of use to Section 4(f) and 6(f) resources were identified in light of the analysis and comparative evaluations in Section 4.10 (Cultural Resources) and Section 4.16 (Socioeconomics and Environmental Justice). For this analysis, impacts to Section 4(f) and Section 6(f) properties are classified as either No Use or Use (Table 4.18-1).

Table 4.18-1  
Impact Definitions for Section 4(f) and Section 6(f) Resources

No Use of a Section 4(f) or Section 6(f) Resource	Use of a Section 4(f) or Section 6(f) Resource
There would not be an actual, temporary, or constructive use of the Section 4(f) and/or 6(f) property. For historic resources, there would not be a direct or indirect alteration of any characteristic of a historic property that qualifies it for inclusion in the NRHP; that diminishes the integrity of its location, design, setting, materials, workmanship, feeling, or association; or that diminishes the extent to which a resource retains its historic appearance (No Effect or No Adverse Effect under Section 106).	There would be an actual, temporary or constructive use of the Section 4(f) and/or 6(f) property. For historic resources, there would be a direct or indirect alteration of any characteristic of a historic property that qualifies it for inclusion in the NRHP; that diminishes the integrity of its location, design, setting, materials, workmanship, feeling, or association; or that diminishes the extent to which a resource retains its historic appearance. Examples could include the destruction of archaeological resources, alteration of historic viewsheds, and/or the modification or demolition of historic buildings (Adverse Effect under Section 106).

#### 4.18.2 No-Action Alternative

Under the No-Action Alternative, the proposed site would continue to be used for mixed-use industrial activities. Activities would likely include the demolition of existing buildings and infrastructure, the alteration of the ground surface, and the installation of new buildings and structures necessary to support the light industries and warehousing/shipping entities that may occupy the future industrial space. These activities would not likely result in a direct use of the two Section 4(f) parks within the study area (Chicora-Cherokee Community Park and Riverfront Park) or the Section 4(f)/6(f) resource (Park South) because the parks are not located within the project site,

and thus would not be permanently incorporated. Similarly, there would not likely be a use of any of the 11 historic properties (Section 4(f) resources) as they are not located within the project site, and thus would not be permanently incorporated.

Construction activities and equipment could create vibrations and noise that may affect the three parks and historic properties; however, potential impacts would be temporary and localized, and based on the analyses presented in Section 4.12 (Noise and Vibration), there would not be a constructive use of Section 4(f) and 6(f) properties within the study area from construction activities.

Indirect impacts associated with the operation of a future industrial use within the project site would likely involve an increase in road and rail traffic as compared to the existing condition, but significantly less than that predicted for the Navy Base ICTF. Increased traffic would create noise and vibrations that might affect nearby historic properties. The intensity of traffic, and its proximity to Section 4(f) and 6(f) properties, is unknown; however, Palmetto Railways would be required to consult with the SHPO to ensure that any activities (and resulting visual alterations or noise and vibration impacts) would be mitigated in accordance with the contractual obligations and covenants from the Programmatic Agreement. As a result, there would be no constructive use of Section 4(f) historic properties from operations at the project site.

Under the No-Action Alternative, it is unlikely that construction and operation activities at the project site would alter the visual setting of historic properties and the three parks. Both Riverfront Park and the Chicora-Cherokee Community Park have intervening vegetation and mature trees that would eliminate the majority of views of any new vertical elements that would be placed on the project site (less than 3-4 stories in height). It is possible that vertical elements in the southern portion of the project site might be visible to users of Park South, but any alteration would be consistent with the industrial setting near the park, as exemplified by the adjacent container storage area immediately to its east. As such, there would not be a constructive use of these Section 4(f) and 6(f) properties from an alteration of the visual setting. As discussed in Section 4.10 (Cultural Resources), there would not be any alteration of the setting of historic properties under the No-Action Alternative (No Effect), and thus there would be no constructive use of these Section 4(f) properties.

#### **4.18.3      Alternative 1: Applicant's Proposed Project (CSX – South via Milford / NS – North via Hospital District)**

Construction and operation activities associated with the Navy Base ICTF would not permanently incorporate the two Section 4(f) parks (Riverfront Park and Chicora-Cherokee Community Park) or the Section 4(f)/6(f) park (Park South) within the study area because these parks are located outside the project site where construction and operation activities would occur. Indirect impacts to these parks would be similar to those identified under the No-Action Alternative, and as a result, there would be no constructive use of the Section 4(f) and 6(f) parks under Alternative 1 (Proposed Project).



As discussed in Section 4.10 (Cultural Resources), historic properties within the study area, and located in the Navy Base ICTF, would be adversely impacted as a result of the construction and operation of the Proposed Project. Specifically, the arrival/departure tracks to the north of the ICTF would bisect the parade ground of the USMC Barracks (and alter the visual setting of this historic property), as well as require the demolition of several contributing elements (e.g., structures) of the CNH historic district. In light of the potential Adverse Effects to these Section 106 historic properties, consultations with the SHPO have commenced. Implementation of Alternative 1 (Proposed Project) would result in a permanent incorporation of these Section 4(f) properties.

Operation of the Navy Base ICTF, including train activity on the northern rail connection through the CNH, would generate vibration and could possibly result in damage to the masonry of the historic properties; however, the vibration analysis discussed in Section 4.12 (Noise and Vibration) found that the ground-borne vibration generated by train activities would produce a negligible impact on the vibration-sensitive receptors along the railroad segments in the study area in comparison with the No-Action Alternative. Therefore, vibration impacts would have no effect to cultural resources, and thus there would be no constructive use of the Section 4(f) and 6(f) resources in the study area.

While construction activities and equipment, as well as the introduction of new vertical elements within the project site, would be visible from the CNY and CNYOQ historic districts, the alteration of the visual setting would have No Effect on these Section 4(f) resources and would not result in a constructive use.

#### **4.18.4      Alternative 2: Proposed Project Site (CSX – South via Milford / NS – North via S-Line)**

Constructive uses of Section 4(f) and 6(f) resources under Alternative 2 would be similar to those described under Alternative 1 (Proposed Project). Ancillary impacts would primarily result from noise and visual alterations, though their effect would not result in a substantial impairment of the resources, and thus there would not be a constructive use. Unlike Alternative 1 (Proposed Project), the arrival/departure tracks to the north of the ICTF would utilize existing CSX ROW along Spruill Avenue and would not traverse through the Hospital District. With this new alignment, there would be no permanent incorporation of the USMC Barracks or the CNH historic district (or any other Section 4(f) or 6(f) resource) as these properties would remain untouched.

Consideration of Alternative 2 as a “prudent” alternative, per the definitions identified by FRA in Section 3.18 (Section 4(f)/6(f) Resources), is warranted because the Proposed Project would permanent incorporate a Section 4(f) resource, whereas another “feasible” alternative (Alternative 2) would not. The final determination on whether or not Alternative 2 is “prudent” will be based on the completed SHPO coordination, the Corps’ identification of the LEDPA, and any other issues raised by the public raised.

#### **4.18.5      Alternative 3: Proposed Project Site (CSX – South via Kingsworth / NS – North via Hospital District)**

Direct and constructive uses of Section 4(f) and 6(f) resources under Alternative 3 would be similar to those under Alternative 1 (Proposed Project). There would be an Adverse Effect to, and a permanent incorporation of, the CNH historic district and the USMS Barracks resulting from the construction of the arrival/departure tracks to the north of the ICTF. Ancillary impacts would primarily result from noise and visual alterations, though their effect would not result in a substantial impairment of any Section 4(f) or 6(f) resource, and thus there would not be a constructive use.

#### **4.18.6      Alternative 4: Proposed Project Site (CSX & NS – South via Milford)**

Direct and constructive uses of Section 4(f) and 6(f) resources under Alternative 3 would be similar to those under Alternative 1 (Proposed Project). There would be an Adverse Effect to, and a permanent incorporation of, the CNH historic district and the USMS Barracks resulting from the construction of the tail tracks to the north of the ICTF. Ancillary impacts would primarily result from noise and visual alterations, though their effect would not result in a substantial impairment of any Section 4(f) or 6(f) resource, and thus there would not be a constructive use.

#### **4.18.7      Alternative 5: River Center Project Site (CSX – South via Milford / NS- North via Hospital District)**

The CNY historic district, the CNH historic district, and the USMC Barracks lie within the River Center project site, with an additional eight historic properties outside the site but within the study area.

Similar to Alternative 1 (Proposed Project), there would be no direct or constructive uses of the Section 4(f) and 6(f) parks within the study area under Alternative 5 because of the distance between the parks and the construction and operation activities associated with the alternative. Placement of the ICTF on the River Center project site would, however, result in the permanent incorporation of historic properties, and thus Section 4(f) resources. Construction activities associated with Alternative 5 would require the removal of multiple elements from the CNY and CNH historic districts, as well as the removal of the USMC Barracks. These direct impacts would result in an Adverse Effect under Section 106, and would constitute direct uses of Section 4(f) properties. While the altered visual setting with the River Center ICTF adjacent to the CNYOQ historic district would result in an Adverse Effect of this Section 4(f) resource, it would not be a constructive use because the impairment is not significant enough to merit such a determination.

Ancillary impacts would primarily result from noise and visual alterations, though their effect would not result in a substantial impairment of any Section 4(f) or 6(f) resource, and thus there would not be a constructive use.

#### **4.18.8 Alternative 6: River Center Project Site (CSX – South via Kingsworth / NS- via Hospital District)**

Direct and constructive uses of Section 4(f) and 6(f) resources under Alternative 6 would be similar to those described under Alternative 5. There would be an Adverse Effect under Section 106 to the CNH and CNY historic districts and the USMS Barracks within the Hospital District because of the demolition of contributing elements of the historic districts, and removal of the barracks. The altered setting of the CNYOQ would not result in a substantial impairment that would be considered a constructive use of the Section 4(f) resource. Ancillary impacts would primarily result from noise and visual alterations, though their effect would not result in a substantial impairment of any Section 4(f) or 6(f) resource, and thus there would not be a constructive use.

#### **4.18.9 Alternative 7: River Center Project Site (CSX & NS – South via Milford)**

Direct and constructive uses of Section 4(f) and 6(f) resources under Alternative 6 would be similar to those described under Alternative 5. There would be an Adverse Effect under Section 106 to the CNH and CNY historic districts and the USMS Barracks within the Hospital District because of the demolition of contributing elements of the historic districts, and removal of the barracks. The altered setting of the CNYOQ would not result in a substantial impairment that would be considered a constructive use of the Section 4(f) resource. Ancillary impacts would primarily result from noise and visual alterations, though their effect would not result in a substantial impairment of any Section 4(f) or 6(f) resource, and thus there would not be a constructive use.

#### **4.18.10 Related Activities**

Construction and operation activities associated with the Related Activities would not result in adverse impacts to Section 4(f) or Section 6(f) resources because they would not occur near or within them. As a result, the Related Activities would not result in permanent incorporation or a constructive use.

#### **4.18.11 Summary of Uses of Section 4(f) and Section 6(f) Resources**

Table 4.18-2 provides a summary of uses of Section 4(f) and Section 6(f) resources within the study area.

Table 4.18-2  
Section 4(f) and Section 6(f) Resources

Alternative	Section 4(f) Resources					Section 4(f) and 6(f) Resources
	<i>Charleston Naval Hospital (CNH) Historic District</i>	<i>Charleston Navy Yard (CNY) Historic District</i>	<i>Charleston Navy Yard Officer's Quarters (CNYOQ) Historic District</i>	USMC Barracks	<i>Other historic properties and parks outside the CNC<sup>1</sup></i>	<i>Park South</i>
<b>No-Action</b>	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting
<b>1: Proposed Project: CSX – Milford / NS – North via Hospital District</b>	No constructive use from noise or vibration; Direct use from permanent incorporation (demolition of contributing elements of the Historic District, and altered setting of the District).	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No constructive use from noise, vibration, and/or alteration of setting; direct use from permanent incorporation (northern rail alignment through parade ground)	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting
<b>2: CSX – Milford / NS – S-line</b>	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting
<b>3: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 1 (Proposed Project), resulting in a	No direct use from permanent incorporation, and no	No direct use from permanent incorporation, and no	Similar to Alternative 1 (Proposed Project), resulting in a	No direct use from permanent incorporation, and no constructive use from vibration,	No direct use from permanent incorporation, and no



Alternative	Section 4(f) Resources					Section 4(f) and 6(f) Resources
	<i>Charleston Naval Hospital (CNH) Historic District</i>	<i>Charleston Navy Yard (CNY) Historic District</i>	<i>Charleston Navy Yard Officer's Quarters (CNYOQ) Historic District</i>	<i>USMC Barracks</i>	<i>Other historic properties and parks outside the CNC<sup>1</sup></i>	<i>Park South</i>
	direct use from permanent incorporation	constructive use from vibration, noise, and/or alteration of setting	constructive use from vibration, noise, and/or alteration of setting	direct use from permanent incorporation	noise, and/or alteration of setting	constructive use from vibration, noise, and/or alteration of setting
<b>4: CSX &amp; NS – Milford</b>	Similar to Alternative 1 (Proposed Project), resulting in a direct use from permanent incorporation	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	Similar to Alternative 1 (Proposed Project), resulting in a direct use from permanent incorporation	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting
<b>5: River Center Project Site: CSX – Milford / NS – North via Hospital District</b>	No constructive use from noise or vibration; Direct use from permanent incorporation (demolition of contributing elements of the Historic District, and altered setting of the District)	No constructive use from noise or vibration; Direct use from permanent incorporation (demolition of contributing elements of the Historic District, and altered setting of the District)	No constructive use from noise, vibration, and/or alteration of setting	Direct use from permanent incorporation (demolition of NRHP-listed building and altered settings of the District)	No direct use from permanent incorporation or constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation or constructive use from vibration, noise, and/or alteration of setting
<b>6: River Center Project Site: CSX – Kingsworth / NS – Hospital</b>	Similar to Alternative 5 resulting in a direct use from permanent incorporation	Similar to Alternative 5 resulting in a direct use from permanent incorporation	Similar to Alternative 5	Similar to Alternative 5 resulting in a direct use from permanent incorporation	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting

Alternative	Section 4(f) Resources					Section 4(f) and 6(f) Resources
	<i>Charleston Naval Hospital (CNH) Historic District</i>	<i>Charleston Navy Yard (CNY) Historic District</i>	<i>Charleston Navy Yard Officer's Quarters (CNYOQ) Historic District</i>	<i>USMC Barracks</i>	<i>Other historic properties and parks outside the CNC<sup>1</sup></i>	<i>Park South</i>
<b>7: River Center Project Site: CSX &amp; NS – Milford</b>	Similar to Alternative 5 resulting in a direct use from permanent incorporation	Similar to Alternative 5 resulting in a direct use from permanent incorporation	Similar to Alternative 5 resulting in a constructive use	Similar to Alternative 5 resulting in a direct use from permanent incorporation	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting	No direct use from permanent incorporation, and no constructive use from vibration, noise, and/or alteration of setting

1. The Ben Tillman Homes, Chicora Elementary School, The Ben Tillman Graded School, Six Mile Elementary School, GARCO Residences [Resources 1663 and 1664], the Charleston Freedman's Cottages [Resources 4306 and 4309], Riverfront Park, and Chicora-Cherokee Community Park.

## 4.18.12 Mitigation

### 4.18.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- See mitigation measures in Section 4.10.12.

These avoidance and minimization measures except the items noted with an asterisk (\*) have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for the Navy Base ICTF is provided in Chapter 6, Table 6.1.

### 4.18.12.2 Additional Potential Mitigation Measures

Alternative 1 (Proposed Project) and Alternatives 3-7 would result in the Adverse Effect to Section 106 historic properties, and as such, a use of Section 4(f) resources. Corps' proposed mitigation measures to mitigate for these Adverse Effects (and use) include:

- Coordination with the SHPO to determine the level and extent of documentation will require development of a Memorandum of Agreement that outlines the appropriate mitigative actions.
- If any previously unknown historic, cultural, or archaeological remains or artifacts are discovered during construction, the District Engineer for the Charleston District, U.S. Army Corps of Engineers, must be notified immediately. Construction activity in the area should be avoided until required coordination has occurred.

The complete list of Corps-proposed avoidance and minimization measures for the Navy Base ICTF is provided in Chapter 6, Table 6-2.

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## 5.0 CUMULATIVE IMPACTS

### 5.1 INTRODUCTION

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, when adding the incremental impact of a Proposed Project to other past, present, and reasonably foreseeable future actions (Future Actions), regardless of what agency (federal or nonfederal) or person undertakes such actions (40 CFR 1508.7). Chapter 3, Affected Environment, presents information about past and present environmental conditions, including past trends that are expected to continue into the future. Chapter 4, Environmental Consequences, presents the environmental and socioeconomic consequences of implementing the Proposed Project and the alternatives. This chapter addresses the cumulative impacts of the Navy Base ICTF when combined with other past, present, and Future Actions.

The cumulative impact assessment provides a broader assessment of potential impacts associated with implementing the Proposed Project and alternatives by considering a wide array of other activities, new and ongoing projects, and programs in the study area. The potential interactions between the Navy Base ICTF and Future Actions and programs are identified in order to assess potential adverse or beneficial cumulative impacts. Each of the resource areas evaluated in the Draft EIS was screened to determine the potential for cumulative impacts, as described below. Those resources with the potential for cumulative impacts were carried forward for further analysis.

The key to a cumulative impact analysis is the identification of Future Actions within a clearly defined geographic and temporal scope. These elements are defined below:

- **Geographic Scope** – The geographic area over which past, present, and Future Actions are identified and evaluated. The geographic scope is related to specific environmental resources. For example, the geographic area over which impacts on air resources (related to the airshed) are considered is different than the area considered for transportation (the county road system). The geographic scope of a cumulative impacts analysis is influenced by both direct and indirect impacts.
- **Temporal Scope** – The time span over which past, present, and Future Actions are identified and cumulative impacts are evaluated. The time span for this analysis is through 2038.

- **Reasonably Foreseeable Future Actions** – Potential federal or nonfederal actions identified within the geographic and temporal scopes of the Proposed Project and alternatives. The predicted impacts of the Future Actions are combined with the potential direct and indirect impacts of the Proposed Project to determine potential future cumulative impacts on a given resource. The term “reasonably foreseeable” is not defined in the regulations. For this analysis, Future Actions are those for which information available suggests that they are likely to occur.

The identification of past, present, and Future Actions and trends involves some uncertainty, as does the assessment of the magnitude of impacts now and in the future. The cumulative impacts analysis is designed to explore the range of potential cumulative impacts while recognizing that uncertainty. Cumulative effects are identified to allow decision makers to be informed that changes may be necessary in existing programs or that future regulatory initiatives may be required.

## 5.2 GEOGRAPHIC AND TEMPORAL SCOPE

A cumulative impacts analysis requires expanding the geographic area of the study beyond that of the Proposed Project and expanding the temporal limits to consider past, present, and future actions that may affect the resources of concern. Individual geographic boundaries (study areas) were established in Chapter 3 for each resource area evaluated in the Draft EIS. These study areas were used in the cumulative impacts analysis.

The Navy Base ICTF would have impacts during construction and operation. The Navy Base ICTF is expected to have a construction period that will last approximately two years, currently anticipated between 2016 and 2018. The time frame for the cumulative impacts assessment extends to the year 2038, which includes the construction period and approximately 20 years of operation, and is consistent with the time frame for other impact analyses presented in this DEIS. This period extends beyond the practical limits of predictability for some topics, such as air quality and water quality issues, but is a reasonable time period for which to assess potential cumulative impacts. The timeframe used for historical examination of cumulative impacts for specific resources varies depending upon the availability and applicability of information.

### 5.3 IDENTIFICATION OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Relevant projects, plans, and programs that could interact with the Proposed Project or the alternatives were identified during the environmental analysis for the specific resource areas. To identify Future Actions, a general literature search was conducted. The following entities were consulted:

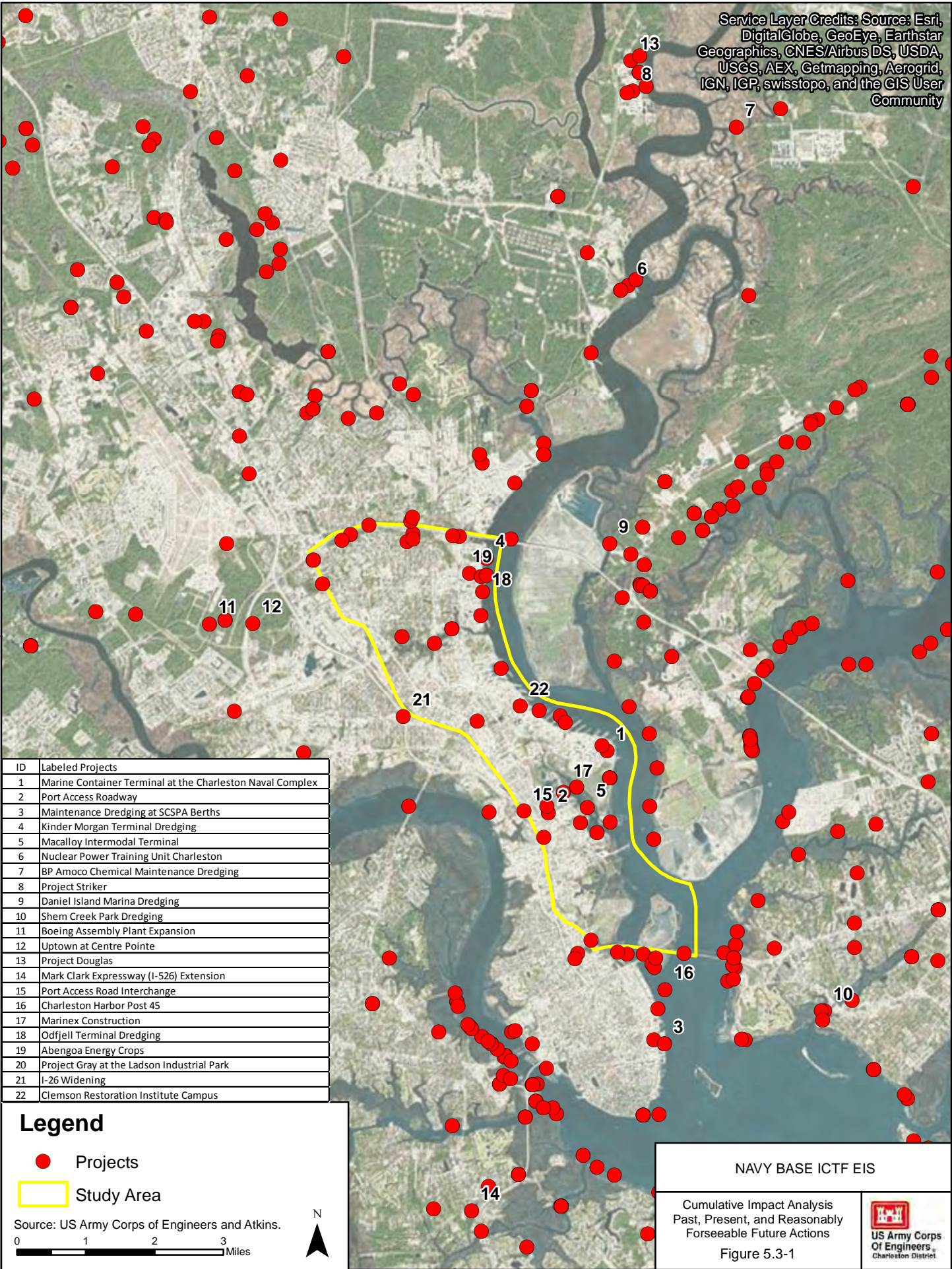
- Berkeley Charleston Dorchester Council of Governments
- Charleston Metro Chamber of Commerce
- South Carolina Department of Commerce
- ICTF Scoping Report
- South Carolina Statewide Transportation Improvement Program
- South Carolina State Rail Plan
- Corps Permit Records and Public Notices

A review of actions noted in these sources indicates that cumulative impacts would result primarily from port and navigational projects, urban and industrial development, and surface transportation projects. Figure 5.3-1 illustrates the locations of the past, present, and Future Actions in relation to the Navy Base ICTF. Types of actions and specific projects are noted in the following subsections. Appendix M contains detailed descriptions of the projects that have been identified.

#### 5.3.1 Port and Navigational Projects

The Port of Charleston and industry linked with Charleston's maritime transportation are major components of the greater metro Charleston economy. The widening of the Panama Canal, expected to be complete in 2014, will allow larger vessels to travel directly from Asia and the Indian sub-continent to East Coast ports. A number of projects have been undertaken or are planned in the Port of Charleston area to accommodate these larger vessels and/or to accommodate projected growth in container cargo. Such projects include the deepening of the Charleston Harbor to 52 feet mean low water (MLW) (Charleston Harbor Post 45), construction of the Hugh K. Leatherman Sr. Terminal (HLT) (formerly the Navy Base Marine Container Terminal at CNC), and expansion of commercial, institutional, and industrial facilities. Many of these projects include development of manufacturing, warehousing, and upland transportation facilities in addition to maritime improvements. There are also numerous community dock facilities planned and under construction to support residential developments throughout the area.







Port and navigational projects that have the potential to contribute to cumulative impacts include:

- Hugh K. Leatherman Sr. Terminal (HLT) (formerly the Navy Base Marine Container Terminal at the Charleston Naval Complex)
- Charleston Harbor Post 45
- Maintenance dredging at SCPA berths
- Kinder Morgan Terminal maintenance dredging
- Kinder Morgan at Shipyard Creek
- Shipyard Creek Associates LLC
- Odfjell Terminal dredging
- Nuclear Power Training Unit Charleston
- BP Amoco Chemical maintenance dredging
- Marinex Construction
- Project Douglas
- Daniel Island Marina Dredging
- Shem Creek Park Dredging
- Abengoa Energy Crops

### 5.3.2 Other Urban and Industrial Development

Urban and industrial development that may contribute to cumulative impacts include industrial or manufacturing facilities, commercial and residential development/redevelopment, institutional development, and public works projects. Industrial and manufacturing facilities that also have a port component are included in the previous section. Urban and industrial development projects include:

- Boeing Assembly Plant expansion
- Uptown at Centre Pointe
- Clemson Restoration Institute Campus

### 5.3.3 Surface Transportation

Surface transportation projects that may contribute to cumulative impacts include improvements to roadways as well as the rail system. The existing transportation system is discussed in Section 3.8. The South Carolina Statewide Transportation Improvement Program (STIP) covers all Federally-funded improvements that are expected to occur within a 6-year period (currently through 2019). The STIP is updated every 3 years and is revised on a continual basis to reflect the latest program and project information (SCDOT 2013). Surface transportation projects include:

- I-26 Port Access Road Interchange
- I-26 widening from Exit 196 to Exit 221 (completed)
- Mark Clark Expressway (I-526) extension

The following rail projects have been recently completed or are proposed by Palmetto Railways:

- Charleston Yard Expansion Project
- Navy Base North End Yard
- Cosgrove Yard Operations

## 5.4 METHODS

The analysis of cumulative impacts related to the Proposed Project and alternatives followed the four steps described below.

**Step 1:** Project-related impacts identified in Chapter 4 were reviewed to determine which environmental resources would likely be affected both by the Proposed Project and by other past, present, and Future Actions. The environmental resources not likely to be affected by the Proposed Project and therefore not likely to be affected by cumulative impacts associated with the Proposed Project were screened and then excluded from further consideration (Table 5.5-1). Environmental resources that could be affected by cumulative impacts were analyzed further. The criteria used to assess and identify cumulatively affected resources followed the methodology presented in the CEQ's *Considering Cumulative Effects* (1997).

**Step 2:** The geographic scope for the cumulative impacts analysis was determined based on the geographic area affected or influenced by the Proposed Project and alternatives. In general, the geographic scope should be consistent with the resources that could reasonably be affected. The temporal scope was established based on the timeframe of the Proposed Project and the Future Actions that were identified and evaluated.

**Step 3:** Future Actions that fell within both the geographic and temporal scopes were identified and evaluated.

**Step 4:** Cumulative impacts were evaluated together with the direct impacts of each alternative—including the No Action Alternative, which serves as a baseline. The range of actions considered in the cumulative impacts analysis included all connected and similar actions that could cumulatively contribute to identified Project-related impacts. Criteria used in identifying cumulatively affected resources included whether (1) the resource is especially vulnerable to incremental impacts; (2) other actions in the same geographic area may result in similar impacts on the resource; (3) impacts have been historically important for the resource; and (4) cumulative impact concerns

have been previously analyzed and identified (USEPA 1999b). A review of the Future Actions in combination with the Proposed Project determines whether projects in the resource-specific study areas for cumulative impacts could result in similar impacts on the resource.

## 5.5 SCREENING FOR CUMULATIVE IMPACTS

Each resource area was researched, reviewed, and evaluated to determine whether Project-related impacts on that resource in concert with other Future Actions would result in the potential for cumulative impacts. This screening revealed that Project-related impacts in several resource categories addressed in the Chapter 4 have the potential to contribute in more than a minor way to cumulative impacts. Other resource areas were determined unlikely to be cumulatively affected or would potentially contribute to cumulative impacts in only a minor way. The resource areas determined to have the potential for more than minor cumulative impacts were carried forward for further consideration and analysis. The rationale for these conclusions is presented in Table 5.5-1.

Table 5.5-1  
Screening of Cumulative Impacts by Resource Area

Resource Area	Potential to Contribute to Cumulative Impacts in More Than a Minor Way?	Rationale
Geology and Soils	No	The Proposed Project and alternatives are anticipated to result in negligible impacts to geology and potentially minor adverse impacts to soils due to erosion, loss of topsoil, soil compaction, and runoff. Construction of the Proposed Project would cause a relatively small demand for fill material in comparison to available resources. Construction of the Proposed Project and alternatives would not impact any soils that comprise sources of potable water. The interaction of the Proposed Project and alternatives with other Future Actions is not anticipated to result in any cumulative impacts to geology and soils.
Hydrology	No	Construction of the Proposed Project and related alternatives (2, 3, and 4) would cause a significant increase in impervious surface. The River Center alternatives (5, 6, and 7) would have a negligible impact on impervious surface. The Proposed Project and all alternatives involve discharge into impaired water bodies; however, implementation of Best Management Practices (BMPs) would be required to reduce pollutant loads and prevent further impairment, resulting in negligible impacts. All alternatives are located in designated floodplains, however there would be a negligible adverse impact to base floodplains resulting from the placement of fill; negligible impact to flood hazard for other adjacent areas. The interaction of the Proposed Project and alternatives with other Future Actions is not anticipated to result in any cumulative impacts to hydrology.

Resource Area	Potential to Contribute to Cumulative Impacts in More Than a Minor Way?	Rationale
Water Quality	No	The Proposed Project and alternatives have the potential to improve surface water quality over existing conditions due to improved treatment of stormwater runoff through addition of detention ponds, a sediment forebay, and implementation of BMPs. All design requirements must be in compliance with the total maximum daily load (TMDL) for dissolved oxygen established for the Charleston Harbor, Cooper, Ashley, and Wando Rivers. Other Future Actions would be subject to similar regulatory standards and are not expected to interact with the Proposed Project or alternatives in a way that would result in cumulative impacts to water quality.
Vegetation and Wildlife	No	Impacts to upland vegetation are anticipated to be minor adverse for all alternatives. Impacts to wetland plant communities would be reduced by the avoidance and minimization of construction activities within tidal wetlands. This includes bridging any roadways and railways that are proposed to impact tidal wetlands and creeks. Impacts to mammals, wading birds, migratory birds, raptors, reptiles, fish, crustaceans and mollusks are anticipated to be minor adverse for all alternatives as a result of potential displacement and/or mortality of individuals during construction activities. The interaction of the Proposed Project and alternatives with other Future Actions is not anticipated to result in any cumulative impacts to vegetation and wildlife.
Waters of the U.S.	Yes	The Proposed Project would result in fill impacts to 12.09 acres of wetland habitat (8.94 acres of estuarine and 1.77 acres of palustrine habitat). Alternatives would result in impacts with similar magnitude. The interaction of the Proposed Project and alternatives with other Future Actions may result in cumulative impacts to Waters of the U.S.
Protected Species	No	With the implementation of avoidance and minimization measures during construction activities and additional potential mitigation measures, the Proposed Project and alternatives would have negligible effects on habitat alteration/fragmentation and species displacement of Protected Species. The interaction of the Proposed Project and alternatives with other Future Actions is not anticipated to result in any cumulative impacts to Protected Species.
Essential Fish Habitat	No	The Proposed Project would result in the loss of 11.57 acres of Essential Fish Habitat (EFH) and a minor impact to federally managed species during construction. Alternatives would result in impacts with similar magnitude. The Proposed Project and alternatives would have a negligible impact to oysters with the implementation of water quality BMPs and the potential for future oyster settlement and propagation. The interaction of the Proposed Project and alternatives with other Future Actions is not anticipated to result in cumulative impacts to EFH.
Traffic and Transportation	Yes	The transportation study was designed to account for other Future Actions in the study area; therefore, the impacts inherently account for cumulative impacts. The interaction of the Proposed Project and alternatives with other Future Actions is anticipated to result in cumulative impacts to transportation within the study area.



Resource Area	Potential to Contribute to Cumulative Impacts in More Than a Minor Way?	Rationale
Land Use and Infrastructure	Land Use - Yes Infrastructure - No	<p>Land Use: Impacts to land use as a result of the Proposed Project and Alternatives 2-4 are anticipated to be major, requiring rezoning as well as an amendment to the City of North Charleston Comprehensive Plan. Impacts to land use as a result of Alternatives 5-7 are anticipated to be negligible and would potentially not require rezoning and a Comprehensive Plan Amendment. The Proposed Project would require the demolition of approximately 100 non-Palmetto Railways owned or specially designated structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 50 structures, all of which would be considered a major adverse impact.</p> <p>Infrastructure: Utility services for potable water, sanitary sewer, natural gas, telecommunications, and solid waste are currently in place and have sufficient capacity to serve the Proposed Project and alternatives. Peak service demands from the five electric cranes on the project site would require upgrades to the local electric utility infrastructure. There may be temporary interruptions of utility services during construction as existing infrastructure is relocated and/or upgraded. No cumulative impacts to utilities are anticipated in the region.</p>
Cultural Resources	Yes	<p>Impacts to historic properties as a result of the Proposed Project and Alternatives 3-7 are anticipated to be adverse for the CNH historic district and the USMC Barracks. Alternative 5 also would impact the CNY and CNYOQ historic district adversely. There would be negligible impacts to the remaining historic properties near the Proposed Project due to vibration. The potential for archaeological sites to exist within the Proposed Project site is minimal. There is the potential that the interaction of the Proposed Project with other Future Actions could result in cumulative impacts to cultural resources.</p>

Resource Area	Potential to Contribute to Cumulative Impacts in More Than a Minor Way?	Rationale
Visual Resources and Aesthetics	Yes	Construction and operation of the Proposed Project would result in a minor, permanent adverse impact to scenic views. Alternatives at the project site would result in impacts with similar magnitude while those alternatives at the River Center Site would be major adverse with placement of the ICTF near Noisette Creek. The Proposed Project and alternatives would result in a major, permanent adverse impact to scenic resources (e.g., historic properties), with the exception of Alternatives 2 and 4 for which there would be minor impacts. There would be a range of negligible to major, permanent adverse impacts to visual quality and character of the Visual Resource Study Area (VRSA) from the construction and removal of structures and mature trees, including contributing elements of a historic district(s) under the Proposed Project and alternatives; Alternatives 2 and 4 would not impact the visual quality and character of historic districts. The introduction of high-mast lighting (illuminated from dusk until dawn) for all alternatives, as well as train head lamps, would introduce minor, permanent impacts from light and glare. Nighttime head lamps from trains could potentially disturb sleep for residences along curvatures in rail tracks under the Proposed Project and Alternatives 2 and 3.
Noise and Vibration	Yes	For the Proposed Project, traffic noise impacts would result in a negligible adverse impact overall and a negligible beneficial effect for several streets. Rail noise impacts would be a minor to moderate adverse impact along several segments due to increased rail activity and new track builds. Rail vibration impacts would be negligible. Construction impacts would be a minor to moderate adverse impact in the vicinity due to frequent operations of construction equipment. Operational impacts would be a minor to moderate exterior daytime adverse impact and major exterior nighttime impact in the vicinity due to standard train/crane operations. This project, when combined with other Future Actions, could result in cumulative impacts.
Air quality	Yes	The Proposed Project would have minor impacts from criteria pollutants from both construction and operation. Criteria pollutants emitted for the Proposed Project and Alternatives 2-4, along with the existing and projected criteria pollutants, would not put the Tri-County area into non-attainment for any criteria pollutants; however, criteria pollutants emitted from Alternatives 5-7, along with the existing and projected criteria pollutants, would put the Tri-County area into non-attainment for the NO <sub>2</sub> 1-hour NAAQS, resulting in a major adverse impact. Impacts from non-DPM HAP emissions would be within the acceptable range. Potential impacts from cancer risk would be within the acceptable range, and impacts from noncancer hazard would be negligible. There is a potential for cumulative impacts to air quality when combined with other Future Actions.

Resource Area	Potential to Contribute to Cumulative Impacts in More Than a Minor Way?	Rationale
Climate Change	No	Climate Change impacts are inherently cumulative in nature. GHG emissions contribute cumulatively and adversely to Global Climate Change, such as sea level rise, increased frequency and intensity of storm events, and impacts to ecosystems. The GHG emissions Inventory would be 30,948 MT CO <sub>2</sub> e from the Proposed Project, resulting in minor long-term adverse impacts. Alternatives would result in impacts with similar magnitude, with the exception of the No-Action Alternative, which would result in a major adverse impact.
Hazardous, Toxic and Radioactive Waste	No	Construction and operation activities would comply with the Navy's permitting process and all applicable laws for testing and disposal of contaminated soils and treatment and disposal of dewatering effluent. All buildings requiring demolition are required to have asbestos and metals-based paint surveys; any impacts would be abated prior to demolition. All fuel and hazardous waste operations would be conducted in compliance with State and Federal regulations. No impacts to Superfund sites or dangerous concentrations of hazardous materials are anticipated. Potential minor adverse impacts could result from the Proposed Project and alternatives. Other Future Actions would be subject to the same regulatory standards and are not expected to interact with the Proposed Project or alternatives in a way that would result in a cumulative impact related to hazardous materials and waste.
Socioeconomics and Environmental Justice	Yes	Construction and operation of the Proposed Project and alternatives would impact community resources, cohesion, business resources, mobility and access, and safety. Major beneficial impact as a result of the construction and operation of the ICTF to local and regional economies. Major adverse impacts to neighborhoods and communities, primarily in the form of residential displacements, would occur under the Proposed Project and alternatives. The Proposed Project and alternatives would also have disproportionately high and adverse impacts to environmental justice populations.
Human Health and Safety	Yes	Overall, impacts to human health and safety as a result of the Proposed Project and alternatives are anticipated to be negligible to minor adverse, and localized. There is a potential that these Project impacts would accumulate with impacts from other Future Actions to create an adverse cumulative impact to human health and safety.
Section 4(f) and 6(f) Resources	Yes	The Proposed Project and Alternatives 3-4 would result in a direct use of the CNH Historic District and USMC Barracks, which are 4(f) resources. Alternatives 5-7 would result in an additional use of the CNY Historic District from permanent incorporation. There is the potential that these project uses would accumulate with uses from other Future Actions to create a cumulative use of Section 4(f) or 6(f) resources.

## 5.6 FURTHER ASSESSMENT OF CUMULATIVE IMPACTS

The Proposed Project and alternatives, in combination with the Future Actions identified in Section 5.2, could result in cumulative impacts. Each resource area with the potential to result in more than minor cumulative impacts (Table 5.5-1) was further considered with regard to the past, present, and Future Actions. These resources are wetlands and other Waters of the U.S., traffic and transportation, land use, visual resources and aesthetics, cultural resources, noise and vibration, air quality, and socioeconomics and environmental justice, human health and safety, and Section 4(f) and 6(f) resources.

### 5.6.1 Wetlands and Other Waters of the U.S.

The Charleston harbor estuary is the State's third largest estuary and is prized for its valuable marshlands and open water habitat; however, this region has been altered by anthropogenic activities for over three centuries (Van Dolah et al. 1990). Many of the developments in the region have taken place on or adjacent to waters of the U.S., resulting in thousands of acres of wetlands altered or filled. Due to historic rice production in the region, a large proportion of wetland loss was located along the Ashley and Cooper Rivers.

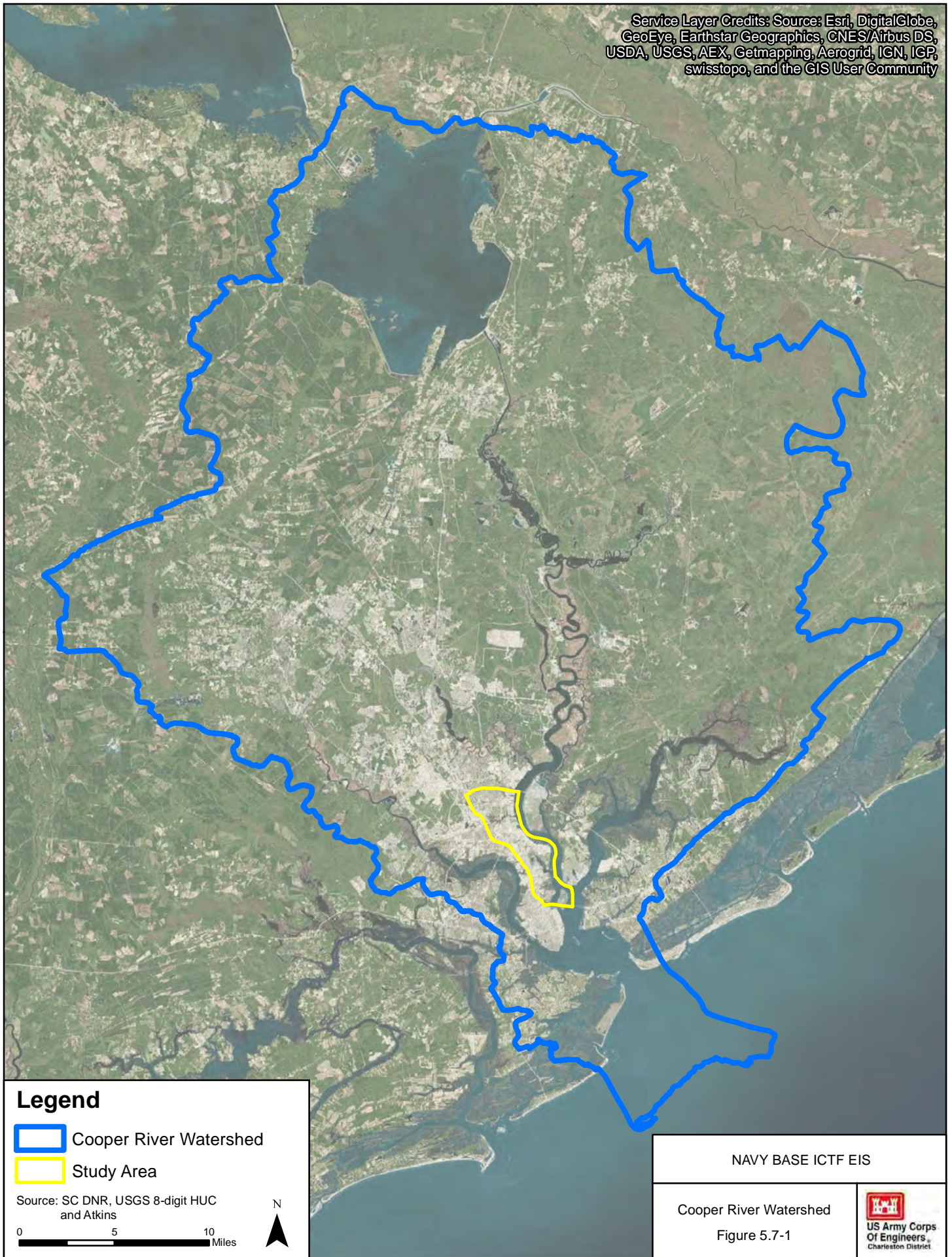
A record of Corps Charleston District DA permits issued from April 1997 to February 2016 was reviewed for the Cooper River watershed (HUC 03050201) (Figure 5.7-1) within the greater Charleston metro area (Charleston, Berkley and Dorchester counties). In this record, only projects with wetland fill impacts were considered for this review. Implementation of these past and present projects has resulted in impacts to 2,135.72 acres of wetland habitat, including 409.53 acres of palustrine wetlands, 112.38 acres of estuarine wetlands and 1,613.82 acres of other wetlands (lacustrine, marine, riverine, riparian, upland or unclassified). The Proposed Project would result in fill impacts to 12.09 acres of wetland habitat (8.94 acres of estuarine and 1.77 acres of palustrine habitat).

Future Actions projects are expected to result in impacts to 252.51 acres of wetland habitat (16.02 acres of estuarine and 236.49 acres of palustrine habitat). It is important to note that one of the largest Future Actions, the Post 45 dredging project, is not included in the Future Actions estimate as the project would have no direct impacts to wetlands resulting from dredging or disposal. The project is expected to indirectly impact approximately 281 acres of wetlands along the Ashley and Cooper Rivers through increases in salinity, which will slowly change portions of the plant assemblage due to salt stress; however, the Post 45 dredging project would likely require mitigation in the form of preservation of about 831 acres of wetlands (Corps 2014).



It is anticipated that all permitted impacts to waters of the U.S., including the Proposed Project and other Future Actions, would be mitigated such that there is no net loss of functional value of estuarine and palustrine wetlands. Therefore, no cumulative impact to waters of the U.S. is anticipated.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



## Legend

-  Cooper River Watershed
-  Study Area

Source: SC DNR, USGS 8-digit HUC and Atkins

0 5 10 Miles



NAVY BASE ICTF EIS

Cooper River Watershed  
Figure 5.7-1



## 5.6.2 Traffic and Transportation

The transportation study detailed in Appendix F was designed to account for other Future Actions in the study area, such as the HLT, committed STIP projects and background traffic growth to 2038. For example, the transportation study took into account projected (2038) port operations at each terminal and the resultant change in intermodal distribution (i.e. less cargo traveling to other terminals as a result of the HLT). Therefore, the impacts outlined below reflect cumulative effects.

The Proposed Project would have a negligible impact during construction to I-26, I-526, US 17, and at-grade rail crossings and a minor cumulative adverse impact during construction to North Charleston intersections. The Proposed Project would have a negligible impact on majority of the I-26 corridor in the opening year 2018 and design year 2038. For I-526, the Proposed Project would have a negligible impact on majority of the corridor in the opening year 2018 and design year 2038. Both of these would have beneficial or adverse permanent cumulative impacts on a few segments due to an LOS change. US 17 operations would have a negligible impact for the opening year 2018 and design year 2038 as the Proposed Project would have minimal influence on the US 17 traffic volumes. North Charleston intersection operations would experience a minor adverse cumulative impact for the opening year 2018 and design year 2038. Traffic patterns would change but slightly more intersections would degrade than improve operations. There would be a moderate adverse cumulative impact for the opening year 2018 and a major adverse cumulative impact for the design year 2038 for at-grade crossing operations as the Proposed Project would increase the frequency and number of train occurrences in North Charleston. Additionally, one new at-grade crossing would be created.

## 5.6.3 Land Use

The construction and operation of the Proposed Project and Alternatives 2-4 would not be consistent with existing zoning classifications nor would it be consistent with the Future Land Use Element of the City of North Charleston Comprehensive Plan. The Proposed Project and its alternatives would require a rezoning as well as an amendment to the Comprehensive Plan. The Proposed Project would require the demolition of approximately 100 non-Palmetto Railways owned or specially designated structures. Additional off-site roadway and rail improvements would cause the demolition of approximately 50 structures, all of which would be considered a major adverse impact. Overall impacts to land use as a result of the Proposed Project and its alternatives would be major.

The other Future Actions considered include projects consistent with the study area (port and navigation projects, urban and industrial development); however, zoning and a comprehensive plan amendment may be required as well. Because the contribution of the Proposed Project is a major land use impact, when combined with other Future Actions, there would be a cumulative impact.



### 5.6.4 Cultural Resources

The Proposed Project and Alternatives 3–7 would have an Adverse effect to historic properties, including the CNH Historic District and the USMC Barracks. Alternative 5 would also have an Adverse effect on the CNY and CNYOQ Historic Districts. There would be negligible impacts to the remaining historic properties near the Proposed Project. The potential for archaeological sites to exist within the project site is minimal. The Proposed Project and alternatives would not result in cumulative impacts in light of the other Future Actions because the Future Actions are not located in the historic districts nor on or adjacent to the other historic properties within the study area.

### 5.6.5 Visual Resources and Aesthetics

Construction and operation of the Proposed Project would result in a minor, permanent adverse impact to scenic views from construction of new rail bridge (adjacent to an existing rail bridge) near Noisette Boulevard over Noisette Creek; major, permanent adverse impacts to scenic resources from the removal of contributing structures to the CNH Historic District and mature trees, as well as altered setting of USMC Barracks; and negligible to major impacts on visual quality and character of the Visual Resource Study Area. The introduction of high-mast lighting (illuminated from dusk until dawn) for all alternatives would introduce minor, permanent impacts from light and glare, and nighttime lighting from train headlamps could disturb sleep for residential structures along rail curvatures.

Other Future Actions in the study area also have the potential to impact visual resources. The HLT would include high-mast lighting and gantry cranes, but the impacts of these features are not anticipated to extend to the same areas that would be impacted by the Proposed Project. The Port Access Road will introduce a new interchange with vertical elements in the study area that will be visible from the area surrounding the Proposed Project; however, the new vertical elements would be consistent with existing two-story structures in the study area, as well as Port structures and would not represent an incongruent visual feature that would result in an adverse visual effect. The Proposed Project and alternatives would result in cumulative impacts to visual resources and aesthetics when combined with Future Actions.

### 5.6.6 Noise and Vibration

The noise and vibration technical memorandum detailed in Appendix H utilized information developed during the transportation study (Appendix F) which was designed to account for other Future Actions in the study area, such as the HLT, committed STIP projects, and background traffic growth to 2038. For example, the transportation study took into account projected (2038) port operations at each terminal and the resultant change in intermodal distribution (i.e., less cargo traveling to other terminals as a result of the HLT). Traffic volumes and rail crossing data, developed for the No Action Alternative and project alternatives for the 2038 design year, accounted for the

background growth rates within that timeframe, and thus incorporated cumulative effects of other concurrent and reasonably foreseeable projects in the study area and the vicinity. Therefore, the resulting traffic and rail noise predictions are considered conservative and incorporate cumulative impacts of other projects. The potential rail vibration impacts, as well as construction and operational noise impacts are local, confined within the immediate vicinity of the rail tracks, project site, or River Center Site, and thus are not considered cumulative.

For the Proposed Project, traffic noise impacts would result in a negligible impact with a negligible beneficial effect for several streets. Rail noise impacts would be a minor to moderate adverse impact along several segments due to increased rail activity and new track builds. Rail vibration impacts would be negligible. Construction impacts would be a minor to moderate adverse impact in the vicinity due to frequent operations of construction equipment. Operational impacts would be a minor to moderate exterior daytime adverse impact, and major exterior nighttime impact, in the vicinity due to standard train/crane operations. Refer to subsection 4.12.3.5 for information on exterior to interior noise reduction. Interior noise levels are not anticipated to disrupt sleep.

Based on the noise and vibration projections analyzed in Section 4.12, it is concluded that other concurrent and reasonably foreseeable future actions provide negligible additional noise or vibration impacts in the study area for the Proposed Project and Alternatives 2 through 7; therefore, no cumulative impacts are anticipated.

### 5.6.7 Air Quality

As discussed in Section 5.3, there are several recent and foreseeable future projects in the project area such as the Charleston Harbor Post 45, construction of the HLT, and Port Access Road Interchange. The analysis below focuses on long-term operational emissions from the Proposed Project and alternatives when combined with anticipated air quality impacts from other Future Actions.

The Charleston Harbor Post 45 project proposes to deepen Charleston Harbor to accommodate larger vessels. The Draft Integrated Feasibility Report and Environmental Impact Statement (FR/DEIS) for Post 45 included an analysis of cumulative air quality impacts from construction of the Post 45 project and the proposed ICTF facility. The FR/DEIS determined that operation of the Post 45 project would not directly increase air pollutant emissions because the project would result in fewer total vessel trips by allowing larger ships to replace trips from several smaller ships (Corps 2014).

The HLT project proposes a marine container terminal at the south end of the former Charleston Naval Complex. The HLT development would support cargo marshalling areas, cargo processing areas, cargo-handling facilities, and related terminal operating facilities. To provide access to this project, the South Carolina Department of Transportation will be constructing a new freeway



interchange on I-26, located south of the existing Meeting Street ramps (Exit 217). The proposed Port Access Road Interchange project will remove the existing Spruill Avenue ramps (Exit 218) and build a new full movement directional T-interchange connecting to the new Port Access Road. The Final EIS prepared for the terminal project included analysis of the I-26 improvements, and these improvements were assumed in the Proposed Project analysis. The Final EIS determined that the projects would result in an increase in emissions from mobile sources, such as marine vessels, container trucks, employee automobiles, and support equipment; however, overall these additional air quality emissions represent a very small percentage of total permitted and mobile emissions in the region. Therefore, the Final EIS determined that the terminal project would result in a minimal adverse impact to regional air quality from its emissions inventory.

The Proposed Project and alternatives would have the potential to increase air pollutant emissions in the study area, including criteria pollutant and Hazardous Air Pollutants (HAPs). Direct impacts of the Proposed Project and alternatives are addressed in Section 4.13; however, the air quality analyses prepared for the cumulative projects determined that these projects would have a minimal impact on regional air quality from their operational emissions inventories. Therefore, although the Proposed Project and alternatives would result in greater direct air pollutant emissions, the Proposed Project and alternatives, in combination with the reasonably foreseeable cumulative projects, would not result in a cumulative impact to the criteria pollutant emissions inventory of the study area.

The HLT project also included dispersion modeling in its air quality analysis to further analyze impacts to the NAAQS (Corps 2006). The Final EIS determined that the total anticipated ambient concentration would remain at or below the NAAQS; however, when the anticipated ambient concentrations of the HLT project are added to the existing ambient concentrations and the anticipated ambient concentrations of the Proposed Project and alternatives, Alternatives 5-7 would put the Tri-County area into non-attainment for NO<sub>2</sub>. Under full operation of Alternatives 5-7, the Tri-County area would not remain in compliance with the NAAQS. Therefore, there would be cumulative impacts for Alternatives 5-7 (River Center site alternatives).

### 5.6.8 Socioeconomics and Environmental Justice

The direct and indirect effects of the Proposed Project and alternatives on socioeconomic resources and environmental justice are presented in Section 4.16. This cumulative effects section focuses on the potential for socioeconomic resources and low-income and minority populations to be impacted by the collective effect of other past, present, and Future Actions in combination with the Proposed Project and alternatives.

During public involvement activities, the community voiced concerns that the Proposed Project may impact community cohesion and stability by reversing the positive investments and changes that have been made in the area in recent years, and may also indirectly impact the stability of newer

businesses and residential developments in the area. These potential effects may be exacerbated when combined with the impacts of additional industrial development and associated rail and truck traffic anticipated as a result of other past, present, and Future Actions in the study area.

In terms of economic and business resources, all Project alternatives would provide indirect, long-term economic benefits to the regional and local community as employment opportunities are directly and indirectly created as a result of the Proposed Project. There is potential for cumulative benefits to economic and business resources as employment opportunities would also be provided by other Future Actions, such as the Boeing Assembly Plant Expansion and the HLT.

As presented in Section 4.16, the Proposed Project and alternatives have the potential for disproportionately high and adverse impacts to Environmental Justice populations. The adverse impacts associated with the Proposed Project and Alternatives 2-4 would be predominantly borne by the minority and low-income population of the Chicora-Cherokee neighborhood and are appreciably more severe than the adverse effects that would be suffered by the nonminority and non-low-income population of the City of North Charleston and Charleston County. Alternatives 5-7 would be predominantly borne by the minority and low-income population in the Hospital District neighborhood (West Yard Lofts) and are appreciably more severe than the adverse effects that would be suffered by the nonminority and non-low-income population of the City of North Charleston and Charleston County. The combination of the Proposed Project and activities at the port and other past, present, and Future Actions in the area, including the HLT, the Port Access Road, and the former Charleston County incinerator to the south of the Proposed Project, would result in cumulative impacts. These cumulative effects would be limited to areas impacted by these previous and ongoing projects, which generally includes the Chicora-Cherokee neighborhood.

### 5.6.9 Human Health and Safety

As discussed in Section 4.17, human health and safety impacts as a result of the Proposed Project and alternatives include increased risk of respiratory problems due to air quality impacts (Alternatives 5-7), increased potential for spill incidents involving petroleum products or hazardous waste, and potential minor adverse impacts to community safety due to additional at-grade crossings and potential for emergency response routes to be blocked by trains. Overall, impacts to human health and safety as a result of the Proposed Project and alternatives are anticipated to be minor to moderate and localized. Due to the spatial extent of the other Future Actions, and localized nature of the Proposed Project impacts, no cumulative impacts to human health and safety are anticipated.

### 5.6.10 Section 4(f) and 6 (f) Resources

The Proposed Project and Alternatives 3-4 would result in a direct use of the CNH Historic District and USMC Barracks, which are 4(f) resources. Alternatives 5-7 would result in an additional use of the CNY Historic District from permanent incorporation. The other Future Actions would not occur near these 4(f) or Section 6(f) resources; therefore there would be not be a cumulative use from permanent incorporation nor from constructive use.

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## 6.1 AVOIDANCE AND MINIMIZATION MEASURES UNDER NEPA

### 6.1.1 Avoidance and Minimization Measures Proposed by the Applicant

The Applicant's measures to avoid and minimize potential impacts of the Proposed Project are summarized by resource area in Table 6-1, based on information provided in various reports and plans submitted by Palmetto Railways. The Corps views these elements as part of the Applicant's Proposed Project for purposes of the environmental impacts analysis presented in Chapter 4. Some of these measures are required under Federal, State, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of the Proposed Project.

Measures from a number of categories in Table 6-1 may be applicable to more than one resource area. For example, certain measures listed under surface water resources may also help to avoid or minimize potential impacts to Waters of the U.S.

Table 6-1  
Summary of Avoidance and Minimization Measures Proposed by the Applicant

Resource Area	Avoidance and Minimization Measures
Geology and soils	<ul style="list-style-type: none"> <li>Implement a Storm Water Pollution and Prevention Plans (SWPPP) as required by the National Pollutant Discharge Elimination System (NPDES) permit, including management of sediment and erosion control.</li> <li>Implement a Spill Prevention Control and Countermeasures (SPCC) Plan for petroleum products.</li> <li>Use Best Management Practices (BMPs) and/or methods of managing sediment and erosion control during construction pursuant to the South Carolina Stormwater Management Handbook (South Carolina Department of Health and Environmental Control [SCDHEC] 2005).</li> <li>Capping contaminated sites within the ICTF to "seal" existing soil and groundwater contamination.</li> <li>Perform all land disturbance activities in compliance the U.S. Navy Construction Process Document (Navy "Dig" Permit) which identifies the permit process and requirements for conducting construction or other land disturbing activities in Land Use Control (LUC) Areas at the former Navy Base (Charleston Naval Complex).</li> <li>Development of a soil management plan during design to be implemented during construction.</li> <li>Capping much of the project site with pavements to mitigate spread of existing contaminants.</li> <li>Use of clean fill material.</li> </ul>

Resource Area	Avoidance and Minimization Measures
<b>Hydrology</b>	<ul style="list-style-type: none"> <li>Design culverts and/or bridges to maintain existing surface drainage patterns and to prevent erosion.</li> <li>Where possible, limit the placement of pilings for bridges within waterways.</li> <li>Design culverts and bridges to maintain existing flow and hydrology for wetland areas and to prevent flooding upstream.</li> <li>Provide stormwater capacity improvements by constructing new stormwater infrastructure where the existing systems are failing from lack of maintenance.</li> </ul>
<b>Water quality</b>	<ul style="list-style-type: none"> <li>Comply with requirements of the NPDES permit, including applicable groundwater and surface monitoring.</li> <li>Implement a SWPPP as required by the industrial storm water NPDES permit.</li> <li>Construct stormwater detention ponds to contain and manage storm water runoff.</li> <li>Implement sediment and erosion control measures to mitigate sediment and sediment-associated pollutant loading from disturbed areas.</li> <li>Implement dust control measures for roads and construction areas.</li> <li>Use of clean fill material.</li> <li>Employ the use of oil-water separators at the locomotive shop and the "Repair in Place" tracks to ensure treatment of any oily waste from on-terminal equipment maintenance activities.</li> <li>Inclusion of forebay in stormwater management system to provide pretreatment of stormwater runoff before it discharges to the primary water quantity and quality control BMP.</li> </ul>
<b>Vegetation and wildlife</b>	<ul style="list-style-type: none"> <li>Redevelopment of an existing industrial site.</li> <li>Replacement of significant and/or grand trees under City of North Charleston tree ordinance and payment to the tree bank account.</li> <li>Plant native vegetation and trees on the earthen berm along the western property boundary.</li> </ul>
<b>Waters of the United States</b>	<ul style="list-style-type: none"> <li>Locate the ICTF on an existing vacant industrial site.</li> <li>Design the ICTF and roadway and rail improvements to minimize impacts to waters of the U.S., such as the drayage road placement that reduce impacts to Waters of the U.S. associated with Shipyard Creek.</li> <li>Minimize impacts by placing new rail infrastructure adjacent to existing bridges that cross Noisette Creek.</li> <li>Where possible, limit the placement of pilings for bridges within waterways.</li> <li>Use of 2:1 slopes in areas that are not bridged.</li> <li>Bridge over Noisette Creek would use a portion of an existing causeway to reduce impacts.</li> <li>Design culverts and bridges to maintain existing flow/exchange and hydrology for wetland areas and marshes.</li> <li>Replacement of earthen berm with a sound attenuation and security wall, where appropriate, in areas adjacent to Waters of the U.S. to avoid filling of wetlands.</li> <li>Submit application for Section 404 Permit as promulgated by Clean Water Act and comply with any requirements as determined by the Corps.</li> <li>Develop and execute wetland mitigation plan to ensure any wetland impacts have been minimized and that compensation will be provided for all remaining unavoidable impacts.</li> </ul>
<b>Threatened and endangered species</b>	<ul style="list-style-type: none"> <li>Timing construction to avoid potential impacts to aquatic species.</li> </ul>
<b>Essential Fish Habitat</b>	<ul style="list-style-type: none"> <li>Where possible limit the placement of pilings for bridges within waterways, ensuring channels are not blocked.</li> <li>Require contractors to use air bubble curtains or sleeve piles to mitigate underwater noise from pile driving activities.</li> </ul>

Resource Area	Avoidance and Minimization Measures
<b>Traffic and transportation</b>	<ul style="list-style-type: none"> <li>• Perform Surface Transportation Study to identify rail and traffic impacts to traffic associated with the Proposed Project.</li> <li>• Project has been designed to enhance efficiency of train movements so that trains are not required to stop while accessing the intermodal terminal and exacerbating traffic congestion associated with at-grade crossings.</li> <li>• *Provide access to St. Johns Ave. for residents and businesses located on the former Navy Base and west of project North Lead railroad track.</li> <li>• *Evaluate engineering options to minimize traffic impacts near the southern loop in response to City of Charleston request.</li> <li>• Extend Cosgrove Ave. with a new overpass over the ICTF north rail lead to facilitate access to the CNC.</li> <li>• Construct improvements to Bainbridge Avenue and N. Hobson Avenue intersection.</li> <li>• Construct auxiliary turn lanes at the ICTF entrance to minimize queuing and reduce traffic delays on N. Hobson Avenue.</li> <li>• Maintain Viaduct Road overpass until the local segment of the port access road is complete.</li> <li>• Construct a private road to eliminate truck traffic on local roadways.</li> <li>• *Open the gate at Turnbull Avenue to provide multiple entry/exit routes for residences along St. John's Avenue.</li> <li>• *Locate roadway improvements to minimize/avoid at-grade crossings and traffic delays associated with rail operations.</li> <li>• *Additional intermodal capacity will encourage rail use and reduce truck traffic on local roads.</li> </ul>
<b>Land use and infrastructure</b>	<ul style="list-style-type: none"> <li>• Ensure the Proposed Project and its operations are consistent with zoning.</li> </ul>
<b>Cultural and community resources</b>	<ul style="list-style-type: none"> <li>• Minimize and avoid impacts to buildings and structures on the CNC.</li> <li>• Minimize and avoid direct interaction with historic buildings and structures.</li> <li>• Relocation of Eternal Father of the Sea Chapel.</li> <li>• Exploration of redevelopment opportunities for historically relevant structures including the Power House.</li> <li>• Mitigate for community impacts associated with the project, including the loss of Sterett Hall.</li> <li>• Support the City of Charleston in setting up Quiet Zones.</li> <li>• Construct a landscaped earthen berm with security fence, use directional lighting, and implement other identified mitigation measures that minimize noise, visual, and air quality impacts to adjacent communities.</li> <li>• Construct a noise abatement wall in areas where there are engineering and environmental constraints with the earthen berm.</li> <li>• *To maximize positive benefit and minimize negative impacts, an expanded Community Mitigation Plan will be developed in partnership with community organizations and State agencies and made a part of the Final EIS.</li> <li>• *A community engagement and awareness plan (Appendix B) is being implemented to keep stakeholders and the public engaged and informed.</li> <li>• Evaluate short and long-term employment and job training opportunities for the local community.</li> <li>• Implement four-container-tall stacking limits to reduce visual impacts on surrounding neighborhoods.</li> <li>• Palmetto Railways is working with the Lowcountry Orphan Relief to mitigate impacts on their location or aid in their relocation if desired.</li> <li>• All business and residential relocations follows federal and state guidelines.</li> </ul>

Resource Area	Avoidance and Minimization Measures
<b>Visual resources and aesthetics</b>	<ul style="list-style-type: none"> <li>Construct a noise wall/earthen berm along the western boundary of the site to minimize visual impacts.</li> <li>Direct operating lights downward to shield light sources and minimize light impacts.</li> <li>Install landscaping within and around the facility footprint to reduce visual impacts.</li> <li>Replacement of significant and/or grand trees under City of North Charleston tree ordinance and/or payment to the tree bank account and adhere to any zoning requirements for tree plantings along building setbacks and road frontages.</li> <li>Provide photometric design for facility high-mast lighting to less than 0.5 foot-candles outside of property boundary.</li> <li>Direct operating lights downward and shield light sources to minimize light impacts to adjacent areas.</li> <li>Project locomotive shop and administration buildings will incorporate architectural elements from historic naval buildings to maintain and enhance aesthetics.</li> </ul>
<b>Noise and vibration</b>	<ul style="list-style-type: none"> <li>Construct a noise abatement wall/berm along the western boundary of the site, between the ICTF and adjacent neighborhoods to minimize noise impacts.</li> <li>Use state-of-the-art equipment, such as electric wide-span gantry cranes, that minimize sound emissions during operations.</li> <li>Implement a 100-foot buffer to reduce the impacts of vibrations from construction and operations of the facility.</li> <li>*The existing topography of the North Lead will require a substantial cut section to provide adequate grades to accommodate train movements. This cut section will mitigate visual and noise impacts that may result from the movement of trains in and out of the facility from the north.</li> </ul>
<b>Air quality</b>	<ul style="list-style-type: none"> <li>*Construct an earthen berm between the processing and classification tracks and adjacent neighborhoods.</li> <li>*Comply with Air Quality State Construction and Operating permit requirements, conditions, and reporting.</li> <li>*Operate and maintain air pollution control equipment in accordance with permit requirements.</li> <li>*Implement dust control measures (such as watering unpaved work areas, temporary and permanent seeding and mulching, covering stockpiled materials, and using covered haul trucks) in accordance with the conditions set forth in the SCDHEC Air permit issued for the Proposed Project.</li> <li>Reduction of truck traffic on local roads by providing additional intermodal capacity.</li> <li>Use electric wide-span gantry cranes that emit zero air emissions versus diesel-powered lift equipment.</li> <li>Construct a semi-automated facility that minimize air quality emissions during operations as a result of increased efficiencies during the handling and processing of containers.</li> <li>Use Tier 4 Utility Truck Rigs (UTR) on the private drayage road to transfer containers to the ICTF versus transferring the same containers using over the road trucks on public roadways to minimize emissions.</li> <li>Limit switching activity within the ICTF to Tier 4 locomotive engines at full build-out.</li> <li>Utilize automated gate system for the over-the-road (OTR) trucks entering/exiting the facility from the Wando Welch and North Charleston Container Terminals and an OCR portal at the connection from the facility (drayage road) to the HLT to reduce onsite idle times of trucks to 7.5 minutes/truckload and UTR to 5 minutes/truckload.</li> </ul>



Resource Area	Avoidance and Minimization Measures
<b>Climate change</b>	<ul style="list-style-type: none"> <li>See measures in Air Quality.</li> </ul>
<b>Hazardous and toxic waste</b>	<ul style="list-style-type: none"> <li>Implement a Solid and Hazardous Waste Management Plan.</li> <li>Implement a SPCC Plan.</li> <li>Comply with Resource Conservation and Recovery Act (RCRA) and SCDHEC requirements for storage and handling of hazardous and toxic wastes.</li> <li>Implement waste minimization measures.</li> <li>Perform all land disturbance activities in compliance the U.S. Navy Construction Process Document (Navy "Dig" Permit) which identifies the permit process and requirements for conducting construction or other land disturbing activities in Land Use Control (LUC) Areas at the former Navy Base (Charleston Naval Complex).</li> </ul>
<b>Socioeconomics and environmental justice</b>	<ul style="list-style-type: none"> <li>Placement of a noise abatement wall/earthen berm, and other Proposed Project features that minimize noise, visual, and air quality impacts to adjacent communities.</li> <li>Contribution to The City of North Charleston of \$8 million to mitigate the impacts to the adjacent communities including loss of Sterret Hall.</li> <li>Construct a noise abatement wall/earthen berm in areas where there are engineering and environmental constraints with the earthen berm.</li> <li>Palmetto Railways is working with DHEC and community groups to determine concerns and identify mitigation measures.</li> <li>*An expanded community mitigation plan will be developed in partnership with community organizations and State agencies.</li> <li>*A community engagement and awareness plan (Appendix B) is being implemented to keep stakeholders and the public engaged and informed.</li> </ul>
<b>Human health and safety</b>	<ul style="list-style-type: none"> <li>Provide around-the-clock security through a combination of security fencing, video cameras, and other security measures.</li> <li>Develop detailed pollution prevention plans and implement BMPs to minimize the potential for spills.</li> <li>Conduct construction and operations in accordance with appropriate regulations, permits, best practices, and codes.</li> <li>Placement of a noise abatement wall/earthen berm, and other Proposed Project features that minimize noise, visual, and air quality impacts to adjacent communities.</li> <li>Construct a semi-automated facility that minimize air quality emissions during operations as a result of increased efficiencies during the handling and processing of containers.</li> <li>Employ the use of automated switches to eliminate the need for train crews to get out of trains to manually throw switches and thus enhancing the safety of railroad workers.</li> <li>Use of inter-box connector (IBC) carts to provide enhanced safety for railroad workers by avoiding slip, trip, and fall incidents while accessing railcars to (un)lock IBCs on containers.</li> <li>Employ the use of an automated gate system to eliminate the need for railroad workers to complete inbound, container and chassis damage inspections by walking in a congested gate area thus enhancing safety of railroad workers.</li> </ul>

### 6.1.2 Additional Mitigation Measures Identified by the Corps

The additional measures the Corps has identified to further mitigate potential impacts of the Navy Base ICTF are listed by resource area in Table 6-2. These measures are summarized from Chapter 4 and presented here for convenience. Additional avoidance, minimization, and mitigation may be identified by the Corps in its decision-making process.

Table 6-2  
Additional Mitigation Measures Identified by the Corps

Resource Area	Avoidance and Minimization Measures
<b>Geology and soils</b>	No additional measures have been identified
<b>Hydrology</b>	The Corps proposes an additional mitigation measure that the pre-construction course, condition, capacity, and location of open waters must be maintained.
<b>Water quality</b>	No additional measures have been identified
<b>Vegetation and wildlife</b>	Any disturbed areas could be sprayed in order to prevent the establishment of invasive, noxious weeds within the disturbed areas.
<b>Waters of the United States</b>	In addition to the measures proposed by the Applicant, the Corps will consider other potential mitigation measures to reduce the impacts on wetlands and Waters of the U.S. resulting from the Proposed Project, which will be included in the FEIS and Record of Decision.
<b>Protected Species</b>	<ul style="list-style-type: none"> <li>• Adherence to the following USFWS Manatee Guidelines during in-water construction: <ul style="list-style-type: none"> <li>○ The permittee will stop work if a manatee is seen near the project site.</li> <li>○ The project manager shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel must monitor water-related activities for the presence of manatee(s) during May 15 through October 15.</li> <li>○ The project manager shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973.</li> <li>○ Any siltation barriers used during the project shall be made of material in which manatees cannot become entangled and must be properly secured, and regularly monitored to avoid manatee entrapment.</li> <li>○ All vessels associated with the project shall operate a “no wake/idle” speeds at all times while in the construction area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.</li> <li>○ If manatee(s) are seen within 100 yards of the active construction area all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area of its own volition.</li> <li>○ Any collision with and/or injury to a manatee shall be reported immediately to Jim Valade of the U.S. Fish and Wildlife Service, North Florida Field Office, at (904) 731-3116.</li> </ul> </li> <li>• The permittee will also stop work if a turtle or sturgeon is seen near the project site during construction.</li> <li>• The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25-40% of the pile driver’s energy, followed by a one-minute waiting period.</li> <li>• During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place.</li> <li>• Adherence to environmental work windows for in-water construction during the winter months when sea turtles are less abundant.</li> </ul>

Resource Area	Avoidance and Minimization Measures
	<ul style="list-style-type: none"> <li>The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to aquatic Protected Species.</li> </ul>
<b>Essential Fish Habitat</b>	<ul style="list-style-type: none"> <li>The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25-40% of the pile driver's energy, followed by a one-minute waiting period.</li> <li>During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place.</li> <li>Adherence to environmental work windows for in-water construction during the winter months when sea turtles are less abundant.</li> <li>The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to marine resources and EFH.</li> <li>Implement a SPCC Plan to minimize the impact of a potential spill event on EFH.</li> </ul>
<b>Traffic and transportation</b>	No additional measures have been identified
<b>Land use and infrastructure</b>	No additional measures have been identified
<b>Cultural resources</b>	<ul style="list-style-type: none"> <li>Coordination with the SHPO is required to determine the level and extent of documentation prior to demolition of any historic property (will require development of a Memorandum of Agreement that outlines the appropriate mitigative actions).</li> <li>If any previously unknown historic, cultural, or archaeological remains or artifacts are discovered during construction, the District Engineer for the Charleston District, U.S. Army Corps of Engineers must be notified immediately. Construction activity in the area should be avoided until required coordination has occurred.</li> </ul>
<b>Visual resources and aesthetics</b>	No additional measures have been identified.
<b>Noise and vibration</b>	No additional measures have been identified.
<b>Air quality</b>	No additional measures have been identified.
<b>Climate change</b>	No additional measures have been identified.
<b>Hazardous, toxic, radioactive waste (HTRW)</b>	No additional measures have been identified.
<b>Socioeconomics and environmental justice</b>	No additional measures have been identified.
<b>Human health and safety</b>	No additional measures have been identified.
<b>Section 4(f) and 6(f) resources</b>	See measures for cultural resources.





## **7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

NEPA-implementing regulations require a review of irreversible and irretrievable effects that result from development of the Proposed Project (40 C.F.R. §§ 1500–1508). Irreversible commitments of resources are those that are expended in a way that cannot be completely restored to their original condition. Irretrievable commitments of resources are those that occur when a resource is removed or consumed and will therefore never be available to future generations for their use. These commitments of resources apply primarily to the use of non-renewable resources such as fossil fuels, water, labor, and electricity. Two categories, Hazardous, Toxic and Radioactive Waste (HTRW) and Human Health and Safety, evaluated in Chapter 4, are not subject to the trade-off between short-term use and long-term productivity and are therefore not evaluated in this section.

Navy Base ICTF construction activities would result in the irretrievable commitment of fossil fuels for electricity and for the operation of vehicles and equipment, as well as labor and fiscal resources that would otherwise be available for other projects. The use of water for dust control during construction activities would be irreversible.

An irreversible and irretrievable loss of existing resources within the Navy Base ICTF study area would also occur as a result of Alternatives 1–7 and the No-Action Alternative. Resources lost would include permanent loss of varying amounts of soil, vegetation, terrestrial and aquatic habitats, Waters of the U.S., EFH, coastal resources, and cultural resources.

Irreversible loss of biological resources would occur under the Navy Base ICTF alternatives. These losses would include Waters of the U.S. such as tidal salt marsh, freshwater wetlands, and tidal open waters; vegetation including marsh, marine water, and urban development land cover classes; and EFH such as estuarine emergent marsh, oyster reefs/shell banks, intertidal flats, and estuarine water column.

Construction of the Navy Base ICTF under Alternatives 1, 3, 4, 5, 6, and 7 would result in the irretrievable loss of NRHP-listed buildings. The potential for archaeological sites to exist within the Proposed Project or River Center project site is unlikely; however, if an archaeological site that is eligible for the NRHP were to be damaged or destroyed, that site would be irretrievable.

### **7.1 UNAVOIDABLE ADVERSE IMPACTS**

NEPA-implementing regulations (40 C.F.R 1502.1 and 1502.16) require disclosure of those adverse environmental impacts that cannot be avoided with the implementation of mitigation measures.

Unavoidable impacts resulting from the Navy Base ICTF alternatives include fugitive dust and exhaust emissions from construction activities, temporary displacement of wildlife species, disturbance of cultural resources, and modifications to scenic resources. In addition, the Navy Base ICTF would result in the introduction of substantial new sources of light and glare that, even after shielding, could disturb nighttime sleep or nighttime activities. The combination of these project effects as well as the potential for noise, vibration, economic, mobility and access, and community cohesion effects would cause major impacts on neighborhoods and environmental justice communities adjacent to the project.

## **7.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY**

NEPA-implementing regulations (40 C.F.R 1502.16) require that an EIS consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. For the purposes of this EIS, short term is defined as the construction period for development of the Navy Base ICTF and long term is defined as the full operation of the Navy Base ICTF.

Construction of the Navy Base ICTF and its alternatives would result in the short-term uses of physical, natural, and cultural resources. Short-term effects of the Navy Base ICTF and its alternatives would include construction-related impacts such as transportation interruptions, temporary displacement of wildlife individuals, altered visual settings, and a localized increase in noise, nighttime light and glare, and air emissions from vehicles and construction equipment. Long-term environmental impacts include the loss of Waters of the U.S., the loss of Essential Fish Habitat, an increase in localized noise and air emissions from vehicles, trucks, and locomotives; the loss of historic resources; new sources of light or glare; altered visual settings; the potential reduced economic viability of new and existing adjacent businesses; and a disproportionate adverse impact to Environmental Justice communities.

Long-term impacts of the Navy Base ICTF would include increased employment opportunities resulting in economic benefits to the local and regional economy. Other long-term benefits may include improvements to water quality through compliance with state water quality standards.

# 8.0 REGULATORY ENVIRONMENT OVERVIEW

This chapter summarizes the Federal, state, regional, and local environmental laws, regulations, and executive orders applicable to the Proposed Project (see Table 8-1). Included in each summary are (a) a brief description of the law, regulation, or executive order; (b) the identification of the agency responsible for ensuring compliance with the law, regulation, or executive order; (c) the applicability of the law, regulation, or executive order to the Proposed Project; and (d) the identification of the appropriate resource area(s) in Chapter 4.

Table 8-1  
Overview of Applicable Laws, Regulations, and Executive Orders

Law/Regulation/Executive Order	Responsible Agency	Applicable Resource Area (Section)
<b>Federal Laws</b>		
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c)	USFWS, Corps	Protected Species (4.6)
Clean Air Act (as amended by P.L. 91-604);	USEPA	Air Quality (4.13)
Clean Water Act of 1972 (33 U.S.C. 1251 et seq.)	Corps, USEPA, USFWS, NMFS, SCDHEC	Water Quality (4.3), Waters of the U.S. (4.5)
The Coastal Zone Management Act of 1972 (P.L. 92-583; 16 U.S.C. 1451-1464)	NOAA's OCRM, SC's OCRM	Hydrology (4.2), Water Quality (4.3)
The Community Environmental Response Facilitation Act of 1992 (P.L. 102-426; 42 U.S.C. 9601 et seq.)	USEPA, US Navy, SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510; 42 U.S.C. 9601 et seq.)	USEPA, US Navy, SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
The Department of Transportation Act (49 U.S.C. 303, Section 4(f))	USDOT (FRA)	4(f)/6(f) Resources (4.18)
The Land and Water Conservation Fund Act (16 U.S.C. 460 1-4, Section 6(f))	DOI/NPS	4(f)/6(f) Resources (4.18)
Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986	USEPA	Hazardous, Toxic, and Radioactive Waste (4.15)
Endangered Species Act of 1973 (P.L. 93-205; 16 U.S.C. 1531(a)-(d))	USFWS, NMFS, Corps	Protected Species (4.6)
Farmland Protection Policy Act (P.L. 97-98 and 7 CFR Part 658)	NRCS	Land Use and Infrastructure (4.9)
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947	USEPA	Hazardous, Toxic, and Radioactive Waste (4.15)

Law/Regulation/Executive Order	Responsible Agency	Applicable Resource Area (Section)
Fish and Wildlife Coordination Act (16 U.S.C. 661-666c)	USACE, USFWS, NMFS, SCDNR	Vegetation and Wildlife (4.4), Protected Species (4.6)
Magnuson-Stevens Fisheries Conservation and Management Act	NMFS, Corps	Essential Fish Habitat (4.7)
Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 et seq.)	USFWS	Protected Species (4.6)
Migratory Bird Treaty Act of 1918	USFWS, SCDNR	Vegetation and Wildlife (4.4)
National Emissions Standards for Hazardous Air Pollutants (NESHAP)	USEPA, SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
National Environmental Policy Act of 1969 ("NEPA" P.L. 91-190; 42 U.S.C. 4321)	Corps, USEPA, FRA	All Sections
National Historic Preservation Act of 1966, Section 106 (P.L. 89-665; 16 U.S.C. 470(f))	Corps, SC SHPO	Cultural Resources (4.10)
Native American Graves Protection and Repatriation Act	Corps, NAHC	Cultural Resources (4.10)
Noise Control Act of 1972 (P.L. 92-574; 42 U.S.C. 4901)	Corps, City of North Charleston	Noise and Vibrations (4.12)
Process to Conduct Construction Activities in Areas under Land Use Controls at the Charleston Naval Complex, Revision 3, dated April 2007	US Navy	Hazardous, Toxic, and Radioactive Waste (4.15)
The Resource Conservation and Recovery Act of 1976 (P.L. 94-580; 42 U.S.C. 6901 et seq., as amended by the Solid Waste Disposal Act of 1980 (P.L. 96-482))	USEPA, SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
Rivers and Harbors Act of 1899 (33 U.S.C. 403)	Corps	Waters of the U.S. (4.5)
Sustainable Fisheries Act of 1996 (PL 104-297)	NMFS	Essential Fish Habitat (4.7)
The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-528; 42 U.S.C. 4601) 49 CFR Part 24 (March 2, 1989)	USDOT, Palmetto Railways	Socioeconomics and Environmental Justice (4.16)
U.S. Environmental Protection Agency Endangerment Finding and Cause or Contribute Finding (2009)	USEPA	Air Quality (4.13)
<b>Federal Executive Orders</b>		
Executive Order 10345 – Environmental Health and Safety Risks to Children	Corps	Human Health and Safety (4.17)
Executive Order 11296 (Flood Hazard Evaluation Guidelines)	Agency providing funds	Hydrology (4.2)
Executive Order 11514 (Protection and Enhancement of Environmental Quality, March 4, 1970)	Corps	All Sections



Law/Regulation/Executive Order	Responsible Agency	Applicable Resource Area (Section)
Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 13, 1971)	Corps	Cultural Resources (4.10)
Executive Order 11988 (Floodplain Management, (43 FR 6030))	Corps	Hydrology (4.2)
Executive Order 11990 (Protection of Wetlands)	Corps	Waters of the U.S. (4.5)
Executive Order 12185	FRA	Irreversible and Irrecoverable Commitments of Resources (Chapter 7.0)
Executive Order 12898 (Federal Actions Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994)	USEPA and Corps	Socioeconomics and Environmental Justice (4.16)
Executive Order 13112 – Invasive Species	Corps	Vegetation and Wildlife (4.4)
Executive Order 13186 – Responsibility of Federal Agencies to Protect Migratory Birds	Corps	Vegetation and Wildlife (4.4)
<b>Federal Regulations</b>		
33 CFR Parts 1 – 200	USCG	Description of the Proposed Project (1.7)
33 CFR Parts 320 – 331	Corps	Waters of the U.S. (4.5)
40 CFR Parts 1500-1508	Corps	All Sections
49 CFR Part 210 – Railroad Noise Emission Compliance Regulations	FRA	Noise and Vibrations (4.12)
<b>State</b>		
Coastal Tidelands and Wetlands Act, §48-39-10, et seq., 1976 SC Code Ann., as amended.	SCDHEC/OCRM	Water Quality (4.3)
South Carolina Coastal Zone Management Program (1976, as amended)	SCDHEC/OCRM	Water Quality (4.3)
SCDHEC/OCRM Rules and Regulations for Permitting in the Critical Areas of the Coastal Zone, R. 30-1, et seq., 1976 SC Code Ann., as amended.	SCDHEC/OCRM	Water Quality (4.3)
SCDHEC 401 Water Quality Certification Regulations, R. 61-101, 1976 SC Code Ann., as amended.	SCDHEC	Water Quality (4.3)
SCDHEC Water Classifications and Standards, R. 61-68, 1976 SC Code Ann., as amended.	SCDHEC	Hydrology (4.2) and Water Quality (4.3)
SCDHEC Classified Waters, R. 61-69, 1976 SC Code Ann., as amended.	SCDHEC	Hydrology (4.2) and Water Quality (4.3)
South Carolina Pollution Control Act, §48-39-10, et seq.	SCDHEC	Water Quality (4.3), Air Quality (4.13), and Hazardous, Toxic, and Radioactive Waste (4.15)

Law/Regulation/Executive Order	Responsible Agency	Applicable Resource Area (Section)
South Carolina Stormwater Management and Sediment Reduction Act, §48-14-10, et seq.	SCDHEC	Water Quality (4.3)
Water Pollution Control Permits, R. 61-9, et seq.	SCDHEC	Hydrology (4.2) and Water Quality (4.3)
SCDHEC Total Maximum Daily Loads for Pollutants in Water. R. 61-110, 1976 SC Code.	SCDHEC	Hydrology (4.2) and Water Quality (4.3)
Air Pollution Control Regulations and Standards – Regulation 61-62 (Statutory Authority: Section 48-1-10 et seq., S.C. Code of Laws, 1976, as amended.)	SCDHEC	Air Quality (4.13)
Protection of Game – Section 50-11-10 et seq., S.C. Code of Laws	SCDNR	Vegetation and Wildlife (4.4)
Nongame and Endangered Species Act – Section 50-15-10 et seq., S.C. Code of Laws	SCDNR	Vegetation and Wildlife (4.4) and Protected Species (4.6)
State Underground Petroleum Environmental Response Bank Act – Section 44-2-10 et seq., S.C. Code of Laws	SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
Hazardous Waste Management Act – Section 44-56-10 et seq., S.C. Code of Laws	SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
South Carolina Solid Waste Policy and Management Act – Section 44-96-10 et seq., S.C. Code of Laws.	SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.15)
Occupational Health and Safety Act – Section 41-15-10 et seq., S.C. Code of Laws	SC Department of Labor, Licensing, and Regulation	Hazardous, Toxic, and Radioactive Waste (4.15)
Standards of Performance For Asbestos Projects – Regulation 61-86.1 (Statutory Authority: Sections 44-1-140; 48-1-30; 44-87-10 et seq. S.C. Code of Laws, 1976, as amended.)	SCDHEC's Asbestos Section	Hazardous, Toxic, and Radioactive Waste (4.15), Human Health and Safety (4.17) and Air Quality (4.13)
<b>Local</b>		
The Zoning Ordinance of the City of North Charleston, South Carolina – (North Charleston, South Carolina Code of Ordinances, Appendix A)	City of North Charleston	Hydrology (4.2), Water Quality (4.3), Vegetation and Wildlife (4.4), Land Use and Infrastructure (4.9), Visual Resources and Aesthetics (4.11)
City of North Charleston District Use Classification – Planned Development District (North Charleston, South Carolina Code of Ordinances, Appendix A, Article V, Section 5-7)	City of North Charleston	Land Use and Infrastructure (4.9)

Law/Regulation/Executive Order	Responsible Agency	Applicable Resource Area (Section)
City of North Charleston Zoning Regulations (Tree Protection and Riparian Buffers) – (North Charleston, South Carolina Code of Ordinances, Appendix A, Article VI, Section 6-16 and 6-17)	City of North Charleston	Vegetation and Wildlife (4.4)
City of North Charleston Stormwater Management Program (North Charleston, South Carolina Code of Ordinances, Appendix A, Article VII, Section 7-2.2)	City of North Charleston	Hydrology (4.2) and Water Quality (4.3)
City of North Charleston Flood Damage Prevention Regulations (North Charleston, South Carolina Code of Ordinances, Ch. 5, Article V)	City of North Charleston	Hydrology (4.2)
Settlement Agreement and Release (Civil Action No: 2011-CP-10-491, 2011-CP-10-493, 2011-CP-10-494, 2011-CP-10-555C, 2011-CP-10-3147),	SCPR and City of North Charleston	Land Use and Infrastructure (4.9)
Site Clearing Permits (Charleston, South Carolina Code of Ordinances, Sec. 7-10 )	City of Charleston	
Stormwater Management and Flood Control (Charleston, South Carolina Code of Ordinances, Ch. 27 )	City of Charleston	Hydrology (4.2) and Water Quality (4.3)
City of Charleston Zoning Ordinance	City of Charleston	Land Use and Infrastructure (4.9)
Tree Protection Requirements(Charleston Zoning Ordinance, Article 3, Part 6	City of Charleston	Vegetation and Wildlife (4.4)

## Acronyms:

Corps – U.S. Army Corps of Engineers  
 FRA – Federal Railroad Administration  
 NAHC – Native American Heritage Commission  
 NMFS – National Marine Fisheries Service  
 NOAA – National Oceanic and Atmospheric Administration  
 NRCS – Natural Resource Conservation Service  
 OCRM – Ocean and Coastal Resource Management  
 SCDHEC – South Carolina Department of Health and Environmental Control  
 SCDNR – South Carolina Department of Natural Resources  
 SHPO – State Historic Preservation Office  
 USCG – U.S. Coast Guard  
 USEPA – U.S. Environmental Protection Agency  
 USDOT – U.S. Department of Transportation  
 USFWS – U.S. Fish and Wildlife Service

## 8.1 FEDERAL LAWS AND REGULATIONS

### Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c)

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle . . . [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb". Spawning, foraging or feeding habitat for the bald eagle (*Haliaeetus leucocephalus*) are present within the Protected Species study area, therefore the Act would apply (see Section 4.6 – Protected Species). The U.S. Fish and Wildlife Service (USFWS) is the agency tasked with ensuring compliance with Bald and Golden Eagle Protection Act.

### Clean Air Act

The Clean Air Act (CAA) of 1970 (42 USC § 1857 et seq., as amended and recodified in 42 USC § 7401 et seq.) requires the U.S. Environmental Protection Agency (USEPA) to establish national ambient air quality standards (NAAQS). The USEPA has primary and secondary NAAQS for the following air pollutants; ozone, respirable particulate matter (PM<sub>10</sub>), fine particulate matter (PM<sub>2.5</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and lead. The primary standards are intended to protect the public health, while the secondary standards are aimed at protecting the public welfare. The CAA also requires each state to prepare an air quality control plan, hereafter referred to as a State Implementation Plan (SIP). Under the CAA, the primary responsibility for achieving and maintaining the NAAQS rests with the state and local agencies. Accordingly, state and local air quality management agencies are also designated as the primary permitting and enforcement authorities for most CAA requirements. States can develop their own ambient air quality standards in addition to the Federal standards (NAAQS). Similar to the NAAQS, the State of South Carolina has established ambient air quality standards (SCAAQS) for the State that also apply to the project site (SCDHEC Regulation 61-62.5). The SCAAQS include the same pollutants and criteria as the NAAQS, and in addition include gaseous fluorides (as hydrogen fluorides). A State Implementation Plan (SIP) is developed and used to determine ways the NAAQS and State Ambient Air Quality Standards will be achieved or maintained. The SIP for South Carolina identifies the ways in which NAAQS will be achieved or maintained within the State, including the Project site. The agencies responsible for ensuring compliance with this act would include the USEPA and the SCDHEC.

Furthermore, Section 176(c) of the CAA requires a General Conformity determination for all federally sponsored or funded actions that are located within areas designated as nonattainment or maintenance per the NAAQS. Areas that meet the NAAQS are classified as "attainment" areas, while areas that do not meet these standards are classified as "non-attainment" areas. Areas that were



designated as a nonattainment area but that were later re-designated as an attainment area and that are required to develop a maintenance plan are called “maintenance” areas. The severity of the classifications for non-attainment range in magnitude from: marginal, moderate, serious, severe, and extreme. All criteria pollutants for Charleston County are in attainment of the NAAQS and the SCAAQS (USEPA 2016); therefore, a General Conformity determination would not be required (see Section 4.13 – Air Quality).

## Clean Water Act

The Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA) (33 USC § 1251 et seq.) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s waters. Amendments to the CWA were enacted in 1981 (Municipal Wastewater Treatment Construction Grants Amendments (P.L. 97-117)) and in 1987 (Water Quality Act of 1987 (P.L. 100-4). The CWA is further intended to achieve a level of water quality that allows for recreation opportunities in and on the water and to promote the propagation of fish and wildlife. Four sections of the CWA are especially pertinent to the Project: Section 303, which requires that states develop Total Maximum Daily Loads (TMDLs) for water bodies included on the Section 303(d) list of impaired waters as a means of reducing water pollution; Section 402, which governs National Pollutant Discharge Elimination System (NPDES) requirements; Section 404, which addresses condition-specific discharges into waters of the U.S.; and Section 401, which requires state certification of any permission granted under the auspices of Section 404. It should be noted that Section 401 requirements are presented after Section 404 in this document because Section 401 requirements are dependent on the actions taken in compliance with Section 404.

### Section 303

Under Section 303(d) of the CWA and USEPA’s Water Quality Planning and Management Regulations (40 CFR Part 13), states, territories, and authorized tribes are required to develop lists of impaired waters. A state’s Section 303(d) impaired waters list is comprised of all waters where the state has identified that required pollution controls are not sufficient to attain or maintain applicable water quality standards. Section 303 also requires that states develop Total Maximum Daily Loads (TMDLs) for water bodies included on the Section 303(d) list of impaired waters as a means of reducing water pollution. A TMDL is the maximum amount of a pollutant a water body can receive and still meet water quality standards.

State waters that do not attain their designated uses are included in the state’s Section 303(d) list of impaired waters. Several waters in the study area are listed as impaired waters (see Section 3.3 – Water Quality). The Proposed Project discharges either directly or indirectly into these impaired water bodies. Consequently, a reduction in pollutant loads would be necessary to meet water quality standards. Structural or non-structural BMPs would need to be employed to reduce pollutant loads

or prevent further impairment (see Section 4.2 – Hydrology and Section 4.3 – Water Quality). SCDHEC would be the agency responsible for ensuring compliance with this section of the CWA.

### **Section 402**

The primary method by which the CWA imposes pollutant control limits is the NPDES permit program, established under Section 402 of the CWA. As part of the NPDES program, any point source discharge of a pollutant or pollutants into any waters of the U.S. must be permitted. Waters of the U.S. include navigable waters; all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce; tributaries to such waters; and wetlands that are adjacent to these waters.

The agency responsible for ensuring compliance with this section of the CWA would be the SCDHEC. The SCDHEC Stormwater Permitting Section provides administration and oversight of the NPDES (National Pollutant Discharge Elimination System) Permitting Program. As the Proposed Project would include modifications (including the removal and/or addition of materials) to waters of the U.S. (see Section 4.5 – Waters of the U.S.), the Proposed Project would be subject to the requirements of Section 402 (see Section 4.3 – Water Quality). See the description of the South Carolina NPDES Stormwater Program below.

### **Section 404**

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Any activity where material is placed in waters of the U.S. and has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of water requires a permit from the Corps. Examples of “fill material” that could be used for the construction of the proposed ICTF project include: rock, sand, clay, soil, rip-rap, or any material that could be used for roadbase, bridge abutments, erosion control, etc. As the Proposed Project would include modifications (including the removal and/or addition of materials) to waters of the U.S. (see Section 4.5 – Waters of the U.S.), it would be subject to the requirements of Section 404 (see Section 4.3 – Water Quality).

#### **404 (b)(1) Guidelines**

Under Section 404(b)(1) of the CWA, the USEPA, in conjunction with the Corps, developed “guidelines” to insure compliance with Section 404 of the CWA when evaluating permit applications. These guidelines are specifically referred to as the “404(b)(1) Guidelines.” These guidelines are heavily weighted towards preventing environmental degradation of waters of the U.S. and therefore place additional constraints on Section 404 discharges. The 404(b)(1) Guidelines specifically outline four conditions that must be satisfied in order to make a determination that a proposed discharge complies with these guidelines. These conditions are referred to as “restrictions on discharge”. In

general, these four “restrictions on discharge” do not allow the Corps to issue a permit if a discharge would:

1. have a “practicable” alternative which would have less adverse impact on the aquatic ecosystem as long as the alternative does not have other significant adverse environmental consequences.
2. cause or contribute to violations of any applicable State water quality standard; violate toxic effluent standards; jeopardize the continued existence of an endangered or threatened species; or violate any marine sanctuary.
3. cause or contribute to significant degradation of the waters of the U.S.
4. not have taken appropriate and practicable steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Each of these “restrictions” has specific requirements in order to determine compliance. Appendix B outlines compliance with these “restrictions.”

The agencies responsible for ensuring compliance with Section 404 would be the Corps, the USFWS, and the National Marine Fisheries Service (NMFS). As the Proposed Project would include modifications (including the removal and/or addition of materials) to waters of the U.S. (see Section 4.5 – Waters of the U.S.), the Proposed Project would be subject to the requirements of Section 404 (see Section 4.3 – Water Quality). The Corps would be responsible for establishing consistency with all applicable elements of the statute.

### **Section 401**

Section 401 of the CWA dictates that applicants for Federal permits that result in discharges to navigable waters must obtain a certification from SCDHEC that the proposed activity will not violate state water quality standards. This includes individual or general Federal permits issued pursuant to Section 404 of the CWA (33 U.S.C.1344), Sections 9 and 10 of the Federal Rivers and Harbors Act of 1899 (33 U.S.C. 401-403), and permits or licenses issued by the Federal Energy Regulatory Commission (16 U.S.C. 1791, et seq.). The Corps Section 404 permit applications cannot be issued without a State-issued Section 401 Water Quality Certification. SCDHEC’s Regulation 61-101, entitled Water Quality Certification, directs the processing of applications for certification.

The agencies responsible for ensuring compliance with this section of the CWA would be SCDHEC with support provided by the USEPA. As the Proposed Project would include modifications (including the removal and/or addition of materials) to waters of the U.S. (see Section 4.5 – Waters of the U.S.), the Proposed Project would be subject to the requirements of Section 401 (see Section 4.3 – Water Quality).

### Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 (16 USC §§ 1451–1465) established a national policy to preserve, protect, develop, and restore the Nation’s coastal zones. Under this act two national programs were created, the National Coastal Zone Management Program (CZMP) and the National Estuarine Research Reserve System. The CZMP is administered by NOAA’s Office of Ocean and Coastal Resource Management (OCRM). The CZMA is intended to “encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values as well as the needs for compatible economic development.” Further, it includes provisions for extensive coordination, cooperation, and participation guidelines for Federal and state agencies, local governments, and the public.

Since the study area is located in one of the eight coastal counties that require the Coastal Zone Consistency Certification or other state permits, the CZMA applies to this activity. The South Carolina Ocean and Coastal Resource Management (OCRM) must review the project through a process called “Coastal Zone Consistency Certification” to make sure that it is consistent with the state coastal management policies before any state or Federal permit can be issued for a project in the coastal zone (see Section 4.2 – Hydrology and 4.3 – Water Quality).

### Community Environmental Response Facilitation Act

The Community Environmental Response Facilitation Act was enacted to amend the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 to require the Federal Government, before termination of Federal activities on any real property owned by the Government, to identify real property where no hazardous substance was stored, released, or disposed of. In the case of any real property owned by the United States and transferred to another person, the United States Government should remain responsible for conducting any remedial action or corrective action necessary to protect human health and the environment with respect to any hazardous substance or petroleum product or its derivatives, including aviation fuel and motor oil, that was present on such real property at the time of transfer. Since the project site was previously owned by the United States Government as a Navy base, the U.S. Navy would be the entity responsible for assuring compliance with this Act. This Act applies to the Proposed Project due to the previous ownership and operation by the U.S. Navy (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste).

### Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510; 42 U.S.C. 9601 et seq.) commonly known as Superfund, was enacted by Congress on December 11,



1980. USEPA's Office of Solid Waste and Emergency Response (OSWER) in Washington, D.C. oversees the Superfund program. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. The law authorizes two kinds of response actions: short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response; and long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on USEPA's National Priorities List (NPL). One NPL site (Macalloy Corporation) is located south of the Project area.

Impacts to Superfund sites or dangerous concentrations of hazardous materials/wastes are not anticipated (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste). However, if discovery of unknown contamination occurs, the Proposed Project would be subject to Superfund regulations. Also, the Navy's permitting process requires stoppage of work if an unanticipated discovery occurs.

#### Department of Transportation Act, Section 4(f)

Section 4(f) of the U.S. Department of Transportation (DOT) Act (49 USC § 303(c)) provides protection for publicly owned parks, recreation areas, wildlife and waterfowl refuges, and historic properties or archaeological sites on or eligible for listing on the National Register of Historic Places (the National Register). With respect to the Navy Base ICTF, the FRA is responsible for protection of these resources, collectively referred to as 4(f) resources. While not binding on FRA, FRA uses FHWA regulations (23 CFR part 774) to guide its interpretation and implementation of Section 4(f).

Specifically, Section 4(f) provides that:

“The Secretary of Transportation shall cooperate and consult with the Secretaries of the Interior, Housing and Urban Development, and Agriculture, and with the States, in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of lands crossed by transportation activities or facilities... The Secretary may approve a transportation program or project...requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significant, or land of an historic site of national, State, or local significance (as determined by Federal, State, or local officials having jurisdiction over the park, area, refuge or site) only if:

- There is no prudent and feasible alternative to using that land; and

- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.”

A “use” of a protected property can occur in one of three ways:

- When land is permanently incorporated into a transportation facility (i.e., demolition or land acquisition);
- When there is a temporary occupancy of land that is adverse in terms of the statute’s preservationist purposes (i.e. physical alteration of the land during construction); or
- When there is a constructive use of a Section 4(f) property (i.e. ancillary impacts such as noise, vibration or visual impacts).<sup>53</sup>

An alternative is not feasible if it cannot be built as a matter of sound engineering judgment. In determining whether an alternative is prudent, the FRA may consider if the alternative would result in any of the following: (1) compromise the project to a degree that is unreasonable for proceeding with the project in light of its stated purpose and need, (2) unacceptable safety or operational problems, (3) after reasonable mitigation the project results in severe social, economic, or environmental impacts; severe disruption to established communities; severe disproportionate impacts on minority or low-income populations; or severe impacts on environmental resources protected under other federal statutes, (4) additional construction, maintenance, or operational costs of an extraordinary magnitude, (5) other unique problems or unusual factors, (6) multiple factors that, while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

The study area contains two parks that are considered 4(f) resources (Riverfront Park and Chicora-Cherokee Community Park), a single park that is considered both a 4(f) and a 6(f) resource (Park South), and 11 historic properties that are considered 4(f) resources. Impacts are discussed in Section 4.18 4(f)/6(f) Resources. As Federal funds may be used for the Proposed Project and there will be “uses” to 4(f) resources, this Act applies (see Section 4.18 4(f)/6(f) Resources). FRA is the Federal agency responsible for enforcing compliance with this Act.

### Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires facilities to prepare for chemical emergencies by developing response plans and communicating with local, state, and Federal officials when on-site quantities of regulated substances exceed threshold planning quantities. Annual reporting requirements are triggered for facilities that manufacture, process or store “hazardous substances” in quantities greater than their corresponding reportable quantities

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<sup>53</sup> A Constructive use occurs when the transportation project does not incorporate land from a Section 4(f) resource but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the resource are substantially diminished.

(RQs) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Under Section 311 and 312, facilities must report to State Emergency Response Commissions (SERC), Local Emergency Planning Commissions (LEPC), and local fire departments using the Tier2Submit program. Under Section 313, facilities must complete and submit a Toxic Chemical Release inventory form (Form R) annually if the facility manufactures or otherwise uses one of the over 600 Toxics Release Inventory (TRI) chemicals above the applicable threshold quantity.

Since the project site's purpose covers potential temporary storage of hazardous substances incident to transportation activities, the Act applies (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste). The agency responsible for compliance with this regulatory requirement would be the USEPA.

### Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 requires a Federal agency authorizing, funding or carrying out a project within its jurisdiction to determine whether any federally listed threatened or endangered species may be present within a study area and determine whether the agency's action could affect any federally listed species. Threatened and endangered species (which are identified in 50 CFR §§ 17.11 and 17.12) are protected and prohibited from "take," defined as direct or indirect harm or harassment, unless a ESA Section 10 permit is granted to an entity other than the Federal agency or a Biological Opinion with incidental take provisions is rendered to a Federal lead agency via ESA Section 7 consultation. Pursuant to the requirements of the ESA, an agency reviewing the Proposed Project within its jurisdiction must determine whether any federally listed or proposed species may be present in the study area and determine whether the Proposed Project is likely to jeopardize the continued existence of such species or result in the adverse modification or destruction of the habitat for such species (16 USC § 1536(a)). Under the ESA, habitat loss is considered to be an impact to a species. Therefore, any project-related impacts to these species or their habitats would be considered significant and would require mitigation.

The agencies responsible for enforcement of this regulatory requirement would include the USFWS and the NMFS. The Protected Species study area includes potential habitat for federally listed animals and plants; therefore, the Proposed Project would be subject to the requirements of the ESA (see Section 4.6 – Protected Species).

### Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 1997); requires that each Federal agency: shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and shall

ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Offsite community impacts are anticipated to affect the human health and safety of the community that includes children, therefore the requirements of this EO will apply (see Section 4.17 – Human Health and Safety). The Corps is charged with ensuring compliance with this EO.

### **Executive Order 11514, Protection and Enhancement of Environmental Quality**

In furtherance of the purpose and policy of the National Environmental Policy Act of 1969 (Public Law No. 91-190, approved January 1, 1970), EO 11514 instructed the Federal Government to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies were directed to initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. The heads of Federal agencies must monitor, evaluate, and control on a continuing basis their agencies' activities so as to protect and enhance the quality of the environment. Such activities shall include those directed to controlling pollution and enhancing the environment and those designed to accomplish other program objectives which may affect the quality of the environment. Agencies shall develop programs and measures to protect and enhance environmental quality and shall assess progress in meeting the specific objectives of such activities. Heads of agencies shall consult with appropriate federal, state and local agencies in carrying out their activities as they affect the quality of the environment. Agencies must have procedures developed to ensure the fullest practicable provision of timely public information and understanding of Federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage state and local agencies to adopt similar procedures for informing the public concerning their activities affecting the quality of the environment. The agency responsible for ensuring compliance with this EO is the Corps because the agency may issue a Section 404 permit, which is a Federal action.

### **Executive Order 11988, Floodplain Management**

Executive Order (EO) 11988, issued in 1977, directs Federal agencies to issue or amend existing regulations and procedures to ensure that the potential effects of any action it may take in a floodplain are evaluated and that its planning programs and budget requests reflect consideration of flood hazards and floodplain management. The purpose this EO is to “avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support or floodplain development wherever there is a practicable alternative.” Guidance for implementation of EO 11988 is provided in the floodplain management guidelines of the U.S. Water Resources Council, 40 CFR 6030, dated February 10, 1978, and in *A Unified National Program for Floodplain Management* (FEMA 248), prepared by the Federal Interagency Floodplain Management Task Force. EO 11988 was amended on January 30, 2015, when



the President signed Executive Order 13690, *Establishing a Federal Flood Risk Management Standard (FFRMS)*.

The agency responsible for ensuring compliance with this EO is the Corps and the regulations would apply because the entire project site falls within floodplains (see Section 4.2 – Hydrology).

### **Executive Order 11990, Protection of Wetlands**

Executive Order 11990, issued in 1977, is intended “to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.” To meet this intent, EO 11990 requires Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. EO 11990 applies to:

- the acquisition, management, and disposition of Federal lands and facilities construction and improvements projects which are undertaken, financed, or assisted by Federal agencies; and
- Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

EO 11990 directs the Corps to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works.

The agency responsible for ensuring compliance with this EO would be the Corps. Based on the Waters of the U.S. study area, which includes wetlands, the Proposed Project would be subject to the requirements of EO 11990 (see Section 4.5 – Waters of the U.S.).

### **Executive Order 11593, Protection and Enhancement of the Cultural Environment**

The Federal Government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Federal agencies have responsibilities consonant with the provisions of the following acts: NEPA of 1969 (83 Stat. 852, 42 U.S.C. 4321 et seq.), the National Historic Preservation Act of 1966 (80 Stat. 915, 16 U.S.C. 470 et seq.), the Historic Sites Act of 1935 (49 Stat. 666, 16 U.S.C. 461 et seq.), and the Antiquities Act of 1906 (34 Stat. 225, 16 U.S.C. 431 et seq.). Federal agencies must initiate measures to assure that where as a result of Federal action or assistance a property listed on the National Register of Historic Places is to be substantially altered or demolished, timely steps be taken to make or have made records, including measured drawings, photographs and maps, of the property, and that copy of such records then be deposited in the Library of Congress as part of the Historic American Buildings Survey or Historic American Engineering Record for future use and reference. Agencies may call on the Department of the Interior

for advice and technical assistance in the completion of the above records. Since there are historical resources in the study area that are or may be eligible for the National Register of Historic Places, the Proposed Project would be subject to the requirements of this act (see Section 4.10 – Cultural Resources). The agency responsible for ensuring compliance with this EO would be the Corps.

#### **Executive Order 12185, Conservation of Petroleum and Natural Gas**

Executive Order 12898, issued in 1979, requires each Federal agency, as defined in Section 103(a)(25) of the Powerplant and Industrial Fuel Act of 1978 (92 Stat. 3297), shall effectuate through its financial assistance programs the purposes of that Act relating to the conservation of petroleum and natural gas. The Proposed Project would be subject to the requirements of this EO (see Chapter 7.0 – Irreversible and Irretrievable Commitments of Resources). The FRA would be the lead agency charged with maintaining compliance with this EO.

#### **Executive Order 12898, Environmental Justice**

Executive Order 12898, issued in 1994, refers to “nondiscrimination in Federal projects substantially affecting human health and the environment” and “providing minority communities and low-income communities with access to public information on, and an opportunity for public participation in, matters relating to human health or the environment.” In particular, it involves preventing minority and low-income communities from being subjected to disproportionately high and adverse environmental effects of Federal actions. FHWA has two orders related to Environmental Justice: Department of Transportation Order 5610.2(a) (May 12, 2012) and FHWA Order 6640.23A (June 14, 2012). The intent of these orders is very similar to EO 12898.

The agencies responsible for ensuring compliance with this EO would be the USEPA and the Corps. Based on data provided by the U.S. Census Bureau, Black or African American minority populations that meet CEQ guidelines for the presence of a minority Environmental Justice population (i.e., the minority population exceeds 50 percent of the total population) are present in the study area, therefore the project must comply with EO 12898 (see Section 4.16 – Socioeconomics and Environmental Justice).

#### **Executive Order 13112, Invasive Species**

Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, (1) identify such actions; (2) subject to the availability of appropriations, and within administration budgetary limits, use relevant programs and authorities to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the

actions. Since there are invasive species documented within the Vegetation and Wildlife study area, there is the potential for their spread due to construction operations. As a result, the Proposed Project would be subject to the requirements of this EO (see Section 4.4 – Vegetation and Wildlife). The Corps would be the lead agency charged with maintaining compliance with this EO.

#### **Executive Order 13186 – Responsibility of Federal Agencies to Protect Migratory Birds**

Executive Order 13186 outlines the responsibility of Federal agencies to protect migratory birds. Agencies must support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Since there are migratory birds documented within the Vegetation and Wildlife study area, there is the potential for impacts due to construction and operations. As a result, the Proposed Project would be subject to the requirements of this EO (see Section 4.4 – Vegetation and Wildlife). The Corps would be the lead agency charged with maintaining compliance with this EO.

#### **Executive Order 13690 – Establishing a Federal Flood Risk Management Standard (FFRMS)**

On January 30, 2015, the President signed Executive Order 13690, which amended E.O. 11988, Floodplain Management, originally issued in 1977. FFRMS seeks to reduce the risk and cost of future flood disasters by ensuring that Federal investments in and affecting floodplains are constructed to better withstand the impacts of flooding. It applies to Hazard Mitigation Assistance Grants, the Public Assistance Program, and any other FEMA grants when they fund construction activities in or affecting a floodplain. FEMA, the Corps, and Housing and Urban Development (HUD) have produced fact sheets in response to several frequently asked questions regarding the intended scope of FFRMS and the anticipated impacts to many of the programs of these agencies.

The agency responsible for ensuring compliance with this EO is the Corps and the regulations would apply because the entire project site falls within floodplains (see Section 4.2 – Hydrology).

#### **Farmland Protection Policy Act**

The Farmland Protection Policy Act (FPPA) of 1981 (7 USC 4201 et seq.) is contained within the greater Agriculture and Food Act of 1981 and is intended to minimize the impact Federal projects have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

The Natural Resources Conservation Service (NRCS) is responsible for ensuring that impacts to farmlands covered by FPPA are minimized. Based on the land uses located within the study area, the Proposed Project is not anticipated to impact farmland, and as such, would not be subject to the requirements of this act (see Section 4.9 – Land Use and Infrastructure).

### **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947**

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947 established both procedures for registering pesticides with the USDA and labeling provisions. The act was originally concerned with the efficacy of pesticides and did not regulate pesticide use. In 1972, FIFRA was amended by the Federal Environmental Pesticide Control Act (FEPCA) by specially authorizing the USEPA to strengthen the registration process by shifting the burden of proof to the manufacturer, enforce compliance against banned and unregistered products, and publicize the new regulations. In its current form, FIFRA is still primarily concerned the registration and labeling of pesticides but also prohibits such acts as using a pesticide in any manner not consistent with the label; dethatching, altering, defacing, or destroying any part of the container or label, and refusing permit authorized USEPA inspections. While FIFRA provides the USEPA with the authority to oversee the sale and use of pesticides, it does not fully supersede state, tribal or local law. The Proposed Project will use pesticides during the construction and operation of the ICTF (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste), therefore the requirements of this Act would apply. The agencies responsible for ensuring compliance with the provisions of the FIFRA include USEPA and SCDHEC.

### **Fish and Wildlife Coordination Act**

The Fish and Wildlife Coordination Act (FWCA) of 1934 (16 USC § 661 et seq.) ensures that fish and wildlife receive consideration equal to that of other project features for projects that are constructed, licensed, or permitted by Federal agencies. The FWCA requires that the views of USFWS, NMFS, and the applicable state fish and wildlife agency be considered when impacts are evaluated and mitigation needs determined. A Coordination Act Report (CAR), documenting the findings and recommendations of the reviewing agencies, is required before the Record of Decision is signed.

The agencies responsible for ensuring compliance with the provisions of the FWCA include the Corps, USFWS, NMFS, and the SCDNR. Based on the fish and wildlife and habitat that are either known to exist or could exist within the Vegetation and Wildlife study area, the Proposed Project would be subject to the requirements of FWCA (see Section 4.4 – Vegetation and Wildlife and Section 4.6 – Protected Species).

### **Land and Water Conservation Fund Act**

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund (LWCF) Act (16 U.S.C. 460 1-4, Section 6(f)). Conversion of these lands for uses other than for outdoor recreation must be approved by the U.S. Department of the Interior. Direct impacts to these resources



are prohibited unless there are no feasible and prudent alternatives for the use of the properties and the project incorporates all possible measures to avoid or minimize harm to such properties.

Park South is located near the southern end of the study area on Spruill Avenue. This 11-acre park includes a playground, basketball court, green space, park benches, and picnic tables. Park South received funding in 1982 through the U.S. Department of the Interior and National Park Service's Land and Water Conservation Fund and is, therefore, a Section 6(f) resource (see Section 4.18 4(f)/6(f) Resources).

### **Magnuson-Stevens Fisheries Conservation and Management Act**

The Magnuson-Stevens Fisheries Conservation and Management Act (MSA) of 1976 (16 USC 1801 et seq.), as amended and reauthorized in 2007 by the Magnuson-Stevens Fisheries Conservation and Management Reauthorization Act (PL 109-479), promotes conservation and management of the Nation's fishery resources. In addition, the MSA promulgated the term essential fish habitat (EFH) to ensure that fishery resources are managed through the regulation of EFH. The MSA defines EFH as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The terms in this definition have been further defined by the U.S. Pacific Fishery Management Council to include:

- aquatic habitat and associated physical, chemical, and biological properties that are used by fish (historically used areas may be included);
- sediment, stream substrates, instream structure, and associated biological communities;
- the habitat required to support a sustainable fishery including that particular species' place in a properly functioning ecosystem; and
- the habitat required to support a full life cycle for the species under consideration.

The NMFS consults with Federal agencies under the MSA in a process similar and often parallel to the ESA Section 7 consultation. Because the Proposed Project would modify designated EFH, consultation with NMFS is anticipated in conformance with the requirements of MSA and would be initiated by the Corps (see Section 4.7 – Essential Fish Habitat).

### **Marine Mammal Protection Act of 1972**

The Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 et seq.) expresses the intent of Congress that marine mammals be protected and encouraged to develop in order to maintain the health and stability of the marine ecosystem. The Act imposes a perpetual moratorium on the harassment, hunting, capturing, or killing of marine mammals and on the importation of marine mammals and marine mammal products without a permit from either the Secretary of the Interior or the Secretary of Commerce, depending upon the species of marine mammal involved. Such permits may be issued only for purposes of scientific research and for public display if the purpose is consistent with the

policies of the Act. The appropriate Secretary is also empowered in certain restricted circumstances to waive the requirements of the Act. The USFWS is responsible for ensuring compliance with this act. The Protected Species study area may contain the presence of suitable foraging and calving habitat for the West Indian manatee. Therefore, it is anticipated that the Proposed Project would be subject to the requirements of the Marine Mammal Protection Act (see Section 4.6 – Protected Species).

### **Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (MBTA), which was first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird,” (16 USC § 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nest, or eggs. The current list of species protected by the MBTA includes several hundred species. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

Compliance with the MBTA would be addressed through compliance with the ESA and CEQA, and the USFWS and the SCDNR are responsible for ensuring compliance with this act. Based on the nesting habitat present within the study area, it is anticipated that the Proposed Project would be subject to the requirements of the MBTA (see Section 4.4 – Vegetation and Wildlife).

### **National Emissions Standards for Hazardous Air Pollutants (40 CFR, Part 61)**

National Emission Standards for Hazardous Air Pollutants (NESHAPS) are stationary source standards for hazardous air pollutants. Hazardous air pollutants (HAPs) are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Part 61 NESHAPS regulate only 7 hazardous air pollutants: asbestos, beryllium, mercury, vinyl chloride, benzene, arsenic, and radon/radionuclides. The NESHAPS are delegated to the states but both USEPA and the states, in this case, SCDHEC, implement and enforce these standards.

The Proposed Project contains a number of buildings with the potential to contain asbestos or metals-based paints that may require demolition or significant renovations. Therefore asbestos and lead paint surveys will be required and any structures confirmed to contain asbestos and/or lead-based paint would need to be addressed according to Asbestos NESHAP regulations prior to their renovation/demolition (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste).

## National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 USC § 4321 et seq., PL 91-190) obligates Federal agencies to evaluate a proposed action, including feasible and reasonable alternatives, and identify mitigation measures to minimize adverse effects when Federal agencies propose to carry out, approve, or fund a proposed action that may have a significant effect on the environment. Compliance with NEPA comes in a variety of chronological steps to determine a project's overall significance, as explained in further detail in Chapters 1 and 2.

The Corps is the lead Federal agency under NEPA for the Proposed Project. Other Federal agencies will rely on the EIS/EIR that the Corps prepares to satisfy NEPA requirements for their individual approvals of the Proposed Project, as needed, and where appropriate.

## National Historic Preservation Act

The NHPA of 1966 (16 USC § 470 et seq.) requires Federal agencies to take into account the effects of a proposed action on properties that have been determined to be eligible for listing in, or are listed in, the National Register of Historic Places.

Section 106 of this act requires that Federal agencies having direct or indirect jurisdiction over a proposed federal, federally assisted, or federally licensed undertaking, prior to approval of the expenditure of funds or the issuance of a license, take into account the effect of the undertaking on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment with regard to the undertaking. If archaeological deposits are found during project activities, work would be stopped. Discoveries would be assessed to determine the significance of the find as required under Section 106.

The agency responsible for ensuring enforcement of the NHPA, as it applies to the Proposed Project, will be the Corps, which will consult with additional agencies such as the South Carolina State Historic Preservation Office (SHPO), as needed. Based on the record of historic resources in the study area, the Proposed Project would be subject to the requirements of the NHPA (see Section 4.10 – Cultural Resources).

## Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (23 USC § 3002) requires Federal agencies to (a) establish procedures for identifying Native American groups associated with cultural items on Federal lands, (b) inventory human remains and associated funerary objects in Federal possession, and (c) return such items upon request to the affiliated groups. The law also requires that any discoveries of cultural items covered by the NAGPRA be reported to the head of the Federal entity, who would notify the appropriate Native American group.

In the event of an accidental discovery of a Native American grave, NAGPRA would apply to the Proposed Project, and the Corps, with assistance from the Native American Heritage Commission (NAHC), would be responsible for ensuring compliance with this regulation (see Section 4.10 – Cultural Resources).

### Noise Control Act

The Noise Control Act (NCA) of 1972 (42 USC §§ 4901–4918) was established to control excessive noise that jeopardizes human health and welfare. Under this act, any Federal department or agency with jurisdiction over a particular property or facility or engaged in any activity resulting in, or which may result in, the emission of noise shall comply with federal, state, interstate, and local requirements respecting the control and abatement of environmental noise.

The agencies responsible for ensuring compliance with this act would be the Corps and the City of North Charleston. Typically, compliance with the NCA is addressed through compliance with local long-term planning documents and municipal codes. The requirements of the NCA would apply to the Proposed Project, based on the high likelihood of construction-related and operation noise; however, compliance with the NCA will be assessed based on the Proposed Project's ability to comply with local regulations and standards regarding noise levels, such as the North Charleston, South Carolina Code of Ordinances Article IX. – Noise (see Section 4.12 – Noise and Vibrations).

### Process to Conduct Construction Activities in Areas under Land Use Controls at the Charleston Naval Complex

Construction of the Proposed Project must comply with Land Use Controls (LUCs) provided in the U.S. Navy document: *Process to Conduct Construction Activities in Areas under Land Use Controls at the Charleston Naval Complex*, Revision 3, dated April 2007. The document requires submittal and approval of a "Charleston Naval Complex LUC Area Construction Permit". The permits are intended to ensure: 1) proper protection of workers and the public, 2) reporting of discovery of any unknown contamination, 3) management of excess soil and groundwater, and 4) posting and use of on-site safety information. In addition, the Division of Public Railways (DPR) has entered into Voluntary Cleanup Contracts (VCCs) for multiple parcels within the study area. These agreements with the SCDHEC require the DPR to comply with the process developed for the Navy document. The potential for the Proposed Project to have involvement with contaminated soils and groundwater and asbestos or metals-based paints is probable (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste).

### Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act

The Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC § 6901 et seq.) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 USC § 9601 et seq.) regulate the hazardous substance sites used by the principal Federal agency



related to the generation of, transport, storage, and disposal of hazardous materials. The operation of underground storage tanks (USTs) became subject to the RCRA regulatory program with enactment of the Hazardous and Solid Waste Amendments of 1984 (HSWA).

The agencies responsible for ensuring compliance with RCRA and CERCLA include the USEPA, the U.S. Navy, and the SCDHEC. In light of the former land uses on the former CNC the project site contains a number of contaminated properties as identified in Phase 1 ESAs (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste).

### **Rivers and Harbors Act**

The Rivers and Harbors Act of 1899 (33 USC 401 et seq.) regulates the development and use of the nation's navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters of the U.S. and vests the Corps with authority to regulate discharges of fill and other materials into such waters.

Revised Guidance on CWA Jurisdiction Following the Supreme Court Decision in *Rapanos v. U.S.* and *Carabell v. U.S.* (Corps and USEPA 2008b) also was applied in evaluating final jurisdiction of non-tidal waters that are considered traditional navigable waters (TNWs). The closest TNW is the Cooper River, which is located within the study area. Tidal surface waters of Noisette Creek, Shipyard Creek, and unnamed tributaries in the Waters of the U.S. study area flow to the Cooper River, therefore, Section 10 does apply to the Proposed Project. Activities likely to occur from the Proposed Project regulated under the Rivers and Harbors Act include fill for bridge pilings, abutments, and/or roadway construction (see Section 4.5 – Waters of the U.S.). The Corps will evaluate impacts from the Proposed Project under Section 10 of the Rivers and Harbors Act simultaneously with Section 404 of the CWA.

### **Sustainable Fisheries Act**

The Sustainable Fisheries Act (SFA) of 1996 (PL 104-297) amended the MSA (16 USC 1801 et seq.), which was the primary law governing marine fisheries management in the Federal waters of the U.S. As stipulated under the SFA, consultation with NMFS is required for any activity that might adversely affect EFH. EFH includes those habitats on which fish rely throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

The agency responsible for ensuring compliance with SFA is the NMFS. Because the Proposed Project would modify designated EFH, consultation with NMFS is anticipated in conformance with the requirements of MSA and would be initiated by the Corps (see Section 4.7 – Essential Fish Habitat).

## Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

The Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of “just compensation.” Additionally, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) (Pub. L. No. 91-646, 42 USC §4601, et seq.), amended 1987: ensures that people who are displaced as a direct result of a federally funded project are treated fairly and equitably. Under the Uniform Act, persons whose real property is acquired or who are displaced in connection with a federally financed project are compensated in a fair and equitable manner. The Uniform Act helps individuals both financially and with advisory services related to relocating their residence or business operation. Uniform Act benefits are available to both owner occupants and tenants of residential or business properties. In some situations, only personal property must be moved from the real property, which also is covered under the relocation program. Any person scheduled to be displaced would be furnished with a general written description of Palmetto Railways’ relocation program that provides, at a minimum, detailed information related to eligibility requirements, advisory services and assistance, payments, and the appeal process. Relocation benefits would be provided to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits under the Uniform Act, to which each eligible owner or tenant may be entitled, would be determined on an individual basis and explained in detail by an authorized right-of-away agent. Relocation assistance would be made available to businesses, including moving reimbursement, relocation notification, and re-establishment expenses.

The Uniform Act also ensures that assistance is available to those displaced and that relocation provisions are safe, sanitary, and affordable. The Proposed Project would result in relocations (see Section 4.16 – Socioeconomics and Environmental Justice) therefore, any person(s) whose property needed to be acquired as a result of the Proposed Project would be compensated by Palmetto Railways in accordance with the U.S. Constitution and the Uniform Act of 1970, as amended.

## U.S. Coast Guard Regulations, 33 CFR Parts 1 – 200

CFR Parts 1-200 specify requirements for applying for a permit to construct or modify bridges crossing the navigable waters of the United States. It also sets forth the procedures by which the application is processed by the USCG. Repairs to a bridge which do not alter the clearances, type of structure, or any integral part of the substructure or superstructure or navigation conditions, but which consist only in the replacement of worn or obsolete parts, may, if the bridge is a legally approved structure, be made as routine maintenance without a formal permit action from the USCG. Bridge construction and bridge repair may be required for the Proposed Project (see Section 1.7 – Description of the Proposed Project); therefore adherence to these regulations would apply.

The USCG would be the lead agency ensuring that regulation requirements are met for bridges crossing navigable waters of the United States under Section 9 of the Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401, and the General Bridge Act of 1946, as amended, 33 U.S.C. 525. The actions

by the USCG require an evaluation under the terms of NEPA, as implemented by the CEQ Regulations (40 CFR 1500-1508) and Commandant Instruction M 16475.1D. The permitting process will require that Palmetto Railways submit a permit application, including documentation of the environmental effects of the Proposed Project. The USCG will consult with other Federal Agencies with legal jurisdiction or special expertise concerning environmental impacts. Comments are also gathered from the public notice and Local Notice to Mariners. During the permitting process, the USCG must ensure that navigational and environmental considerations are carefully considered in each permitting decision. Navigation factors to be considered include the vertical and horizontal clearances, existing bridges on the waterway, complaints against existing bridges, recreational and commercial use of the waterway, including access by vessels to existing local service facilities. Environmental considerations include impacts on water quality, the coastal zone, floodplains, historic resources, wetland impacts, threatened or endangered species, noise, air quality, wild and scenic rivers, prime and unique farmlands, and relocations.

### **U.S. Army Corps of Engineers Regulations (33 CFR Parts 320 – 331)**

33 CFR Parts 320 – 331 covers general regulatory policies, permits for dams and dikes in navigable waters of the U.S., permits for structures or work in or affecting navigable waters of the U.S., permits for discharges of dredged or fill material into waters of the U.S., permits for ocean dumping of dredged material, processing of department of the army permits, enforcement, public hearings, definition of waters of the U.S., definition of navigable waters of the U.S., nationwide permit program, and administrative appeal process.

Activities likely to occur from the Proposed Project include fill for bridge pilings, abutments, and/or roadway construction (see Section 4.5 – Waters of the U.S.). The Proposed Project would also include modifications (including the removal and/or addition of materials) to waters of the U.S. (see Section 4.5 – Waters of the U.S.). The Proposed Project would be subject to the requirements of these regulations.

### **NEPA-implementing Regulations (40 CFR Parts 1500-1508)**

NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals (section 101), and provides means (section 102) for carrying out the policy. Section 102(2) contains “action-forcing” provisions to make sure that Federal agencies act according to the letter and spirit of the Act. The regulations in 40 C.F.R. Parts 1500-1508 implement section 102(2). Their purpose is to outline for Federal agencies what they must do to comply with the procedures and achieve the goals of the Act. The President, the Federal agencies, and the courts share responsibility for enforcing the Act, however for this Proposed Project, the Corps is the lead Federal agency.

FRA has developed Procedures for Considering Environmental Impacts (FR Doc. 99-13262) which supplement and adhere to 40 C.F.R Parts 1500-1508 and DOT Order 5610.1C. Because

Palmetto Rail may apply for FRA funding for the Proposed Project, FRA is a Cooperating Agency with the Corps. As such, FRA is responsible for performing the functions stated in CEQ 1501.6(b), which involves reviewing the work of the lead agency to ensure that its work product will satisfy the requirements of the FRA under FR Doc. 99- 13262.

### **U.S. Environmental Protection Agency Endangerment Finding and Cause or Contribute Finding (40 C.F.R. Chapter 1) (2009)**

In its Endangerment Finding (40 C.F.R. Chapter 1), the Administrator of the USEPA found that GHGs in the atmosphere threaten the public health and welfare of current and future generations. The Administrator also found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare. Although the Endangerment Finding does not place requirements on industry, it is an important step in the USEPA's process to develop regulations. This action was a prerequisite to finalizing the USEPA's proposed GHG emission standards for light-duty vehicles, which were finalized in May 2010. In the USEPA's Cause or Contribute Finding the Administrator found that the combined emissions of these well-mixed GHG from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

### **Railroad Noise Emission Compliance Regulations (49 CFR Part 210)**

These regulations prescribe the minimum compliance for enforcement of the Railroad Noise Emission Standards established by the Environmental Protection Agency in 40 CFR part 201.

## **8.2 STATE LAWS AND REGULATIONS**

### **Coastal Tidelands and Wetlands Act (SC Code of Laws Ann. Section 48-39-10 et seq.), South Carolina Coastal Zone Management Program (1976, as amended), and SCDHEC/OCRM Rules and Regulations for Permitting in the Critical Areas of the Coastal Zone, R. 30-1, et seq., 1976 SC Code Ann., as amended**

The South Carolina Coastal Zone Management Act (SC Code of Laws Ann. Section 48-39-10 et seq.) was passed by the 1977 General Assembly of South Carolina to provide for the protection and enhancement of the State's coastal resources. These regulations can be found in OCRM's Critical Area Permitting Regulations, published April 25, 2008. In critical areas of the coastal zone, it is OCRM policy that, in determining whether a permit application is approved or denied, OCRM "shall base its determination on the individual merits of each application, the policies specified in Sections 48-39-20 and 48-39-30 (of the Act)." The OCRM administers the South Carolina Coastal Zone Management Act and has direct permitting authority over the "critical areas" of the coast. OCRM must balance the public's desire to utilize South Carolina's natural resources while protecting environmental quality. OCRM's responsibility, as implemented under the Regulations, is to ensure that impacts to coastal resources are minimized.



Also, to ensure that stormwater runoff during construction of projects and following project completion do not have a negative effect on rivers, streams, marshes and other sensitive areas of the coast, OCRM regulates permitting for high- ground land disturbance. A stormwater management and sediment control plan is required for any construction/land disturbance activities in the coastal region (see Section 4.3 – Water Quality).

OCRМ is required to review all state and Federal permit applications for consistency with the South Carolina Coastal Zone Management Plan. Because the Proposed Project falls within the critical area, a permit would be required. A Construction in Navigable Waters Permit would not be required because the Proposed Project is in tidal areas (also known as critical areas) that are under the direct permitting jurisdiction of the OCRМ.

When reviewing permit applications, OCRМ considers:

- (a) In the planning of major transportation routes and airports, these projects should be sited for location inland from the critical areas;
- (b) The location and design of public and private transportation projects must avoid the critical areas to the maximum extent feasible. Where coastal waters and tidelands cannot be avoided, bridging rather than filling of these areas will be required to the maximum extent feasible;
- (c) Where wetlands will be destroyed, their value as wetlands will be assessed by the Department and weighed against public need for their destruction;
- (d) To the maximum extent feasible, transportation structures must be designed so as not to alter the natural water flow and circulation regimes or create excessive shoaling or erosion. Where applicable, adequate clearance for commercial and pleasure craft must be provided;
- (e) Where feasible, maximum care shall be taken to prevent the direct drainage of runoff water from transportation routes and associated facilities from entering adjacent water bodies;
- (f) Where appropriate, bridges and approaches should be designed to provide for the enhancement of public access by the utilization of fishermen, catwalks, boat launching ramps, bike lanes and other structural features;
- (g) During the planning of a multi-lane widening or improvement project, it is preferable to follow the existing alignment in wetland areas. Existing causeway and fill areas must be utilized wherever possible. The degree to which any existing causeway through wetlands can be widened must be reasonably proportionate to the expected traffic load of the causeway in the near future and the size and use of the area being provided access. The width of medians of divided highways must be reduced as much as possible wherever they cross wetland areas;
- (h) Roadway embankments and fill areas shall be stabilized by utilizing appropriate erosion devices and/or techniques in order to minimize erosion and water quality degradation problems. Culverts shall be required, where appropriate, in order to maintain normal tidal influence and minimize disruption of drainage patterns;
- (i) The Department will require applicants for transportation project permits to consider the accommodation of other public utilities in facility design, thus avoiding unnecessary future

alteration such as that caused by the laying of cables or transmission lines in wetlands adjacent to an existing roadway;

- (j) New road or bridge projects involving the expenditure of public funds to provide access to previously undeveloped barrier islands will not be approved unless an overriding public interest can be demonstrated.

**SCDHEC 401 Water Quality Certification Regulations, R. 61-101, 1976 SC Code  
Ann., as amended**

Section 401 of the CWA dictates that applicants for Federal permits that result in discharges to navigable waters must obtain a certification from SCDHEC that the proposed activity will not violate state water quality standards. This includes individual or general Federal permits issued pursuant to Section 404 of the CWA (33 U.S.C. 1344), Sections 9 and 10 of the Federal Rivers and Harbors Act of 1899 (33 U.S.C. 401-403), and permits or licenses issued by the Federal Energy Regulatory Commission (16 U.S.C. 1791, et seq.). The Corps Section 404 permit applications cannot be issued without a State-issued Section 401 Water Quality Certification. SCDHEC's Regulation 61-101, entitled Water Quality Certification, directs the processing of applications for certification.

The SCDHEC administers the Water Quality Certification program pursuant to Section 401 of the CWA. Since activities requiring a Federal 404 permit (a Corps permit for the discharge of dredged or fill material) result in a discharge to waters or wetlands, SCDHEC must take certification action on all 404 permit applications. USCG permits also require states to take Water Quality Certification action. Because the Proposed Project would require a 404 permit and a USCG permit, a SCDHEC Water Quality Certification will also be required for the Proposed Project (see Section 4.3 – Water Quality).

SCDHEC considers other factors to determine whether to issue a Section 401 Water Quality Certification, including:

- whether the activity is water dependent;
- the intended purpose of the activity;
- whether there are feasible alternatives to the activity; and
- all potential water quality impacts associated with the project, both direct and indirect, over the life of the project, including impacts on existing and classified uses; physical, chemical, and biological impacts, including cumulative impacts; the effect on circulation patterns and water movement; and the cumulative impacts of the proposed activity and reasonably foreseen similar activities of the applicant and others.

This Water Quality Certification must state that applicable effluent limits and water quality standards will not be violated and the certification must be denied if SCDHEC does not have a reasonable assurance that the proposed activity will not cause or contribute to a violation of water quality standards.

**SCDHEC Water Classifications and Standards, R. 61-68, 1976 SC Code Ann., as amended and SCDHEC Classified Waters, R. 61-69, 1976 SC Code Ann., as amended.**

Pursuant to South Carolina Code Sections 48-1-10, et seq. of the 1976 South Carolina Code of Laws, the Department of Health and Environmental Control promulgated regulations to implement the South Carolina Pollution Control Act. R. 61-68, Water Classifications and Standards, establish appropriate classified water uses to be achieved and protected, establish general rules and specific water quality criteria to protect classified and existing water uses, establish antidegradation rules, protect the public health and welfare, and maintain and enhance water quality. The water quality standards also serve as a basis for decision making in other water quality program areas. National Pollutant Discharge Elimination System (NPDES) permit limitations for waste discharges are based upon the classifications and water quality standards of the receiving waters. This regulation also governs the control of toxic substances, thermal discharges, stormwater discharges, dredge and fill activities, and other water related activities.

R. 61-69, Classified Waters, is the only repository of the State's site-specific water quality standards and provides a listing of all named waterbodies, some specific unnamed waterbodies, their classifications, and locations. R. 61-69 identifies the water quality standards that apply to the tidal saltwaters in the study area. These applicable standards are enforceable by NPDES permits or other regulatory mechanism. The Proposed Project discharges either directly or indirectly into water bodies and discharge must meet water quality standards. Structural or non-structural BMPs would need to be employed to reduce pollutant loads (see Section 4.2 – Hydrology and Section 4.3 – Water Quality). SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

**South Carolina Pollution Control Act, §48-39-10, et seq.**

The South Carolina Pollution Control Act defines the public policy of the State to maintain reasonable standards of purity of the air and water resources, consistent with the public health, safety and welfare of its citizens, maximum employment, the industrial development of the State, the propagation and protection of terrestrial and marine flora and fauna, and the protection of physical property and other resources. The SCDHEC was delegated the rulemaking and enforcement authority to abate, control and prevent pollution. Because construction and operation of the Proposed Project could result in water and air pollution, this Act would apply (see Section 4.3 – Water Quality, Section 4.13 – Air Quality, and Section 4.15 – Hazardous, Toxic, and Radioactive Waste).

**South Carolina Stormwater Management and Sediment Reduction Act, §48-14-10, et seq.**

This act allows the SCDHEC Bureau of Water to implement standards for managing stormwater runoff and controlling sediment loading to surface waters. These regulations, revised in June 2002,

are provided in the *Standards for Stormwater Management and Sediment Reduction Regulations* 72-300 through 72-316. These regulations detail permit requirements and outline specific design criteria and specifications for stormwater facilities. Activities are deemed exempt if land-disturbing activities are conducted pursuant to a Federal environmental permit, including Section 404 of the Federal CWA. The Proposed Project will be required to obtain a Section 404 permit.

#### **Water Pollution Control Permits, R. 61-9, et seq.**

The South Carolina NPDES and Land Application Permits Regulation regulates stormwater point source discharges for municipal separate storm sewer systems (MS4s), construction activities, and industrial activities. The *BMP Handbook* (SCDHEC 2005b) is a guide for stormwater management and erosion and sediment reduction BMPs and details procedures to control and limit sediment discharge, in addition to designs for installation and maintenance of various stormwater and erosion control systems. Stormwater runoff from industrial activities cannot discharge without an NPDES discharge permit. This permit requires the development of a Stormwater Pollution Prevention Plan (SWPPP), which includes BMPs to minimize pollution to receiving water bodies. SCDHEC Regulation 72-101, Erosion and Sediment Reduction and Stormwater Management, is the regulation that would apply to this site and activity because these regulations apply to land-disturbing activities on state-owned lands (land either owned by the state, a state agency, or a quasi-state agency under the management or control of such entities through right-of-way easements or other agreements between the entities and private landowners, except as exempted by these regulations). However, since the study area is located in one of the eight coastal counties that require the Coastal Zone Consistency Certification or other state permits, conditions may be added to address stormwater and sediment control issues for this activity. The SC OCRM must review the Proposed Project through a process called “Coastal Zone Consistency Certification” to make sure that it is consistent with the state coastal management policies before any state or Federal permit can be issued for a project in the coastal zone (see Section 4.2 – Hydrology and Section 4.3 – Water Quality).

#### **Total Maximum Daily Loads for Pollutants in Water. R. 61-110, 1976 SC Code.**

Section 303(d) of the Federal Water Pollution Control Act (33 USC Section 1313(d)) requires States to establish the total loading that a water can receive without violating State water quality standards for waters that do not meet them. This regulation defines the term “Total Maximum Daily Load” (TMDL) and defines the administrative appeal process for TMDLs. In addition, the regulation provides for public notice, public hearing, and notice of proposed decision, and addresses revisions to approved TMDLs.

State waters that do not attain their designated uses are included in the state’s Section 303(d) list of impaired waters. Several waters are on the 2012 list of impaired waters (see Section 3.3 – Water Quality). The Proposed Project discharges either directly or indirectly into these impaired water bodies. Consequently, a reduction in pollutant loads would be necessary to meet water quality



standards. Structural or non-structural BMPs would need to be employed to reduce pollutant loads or prevent further impairment (see Section 4.2 – Hydrology and Section 4.3 – Water Quality). SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

**Air Pollution Control Regulations and Standards – Regulation 61-62 (Statutory Authority: Section 48-1-10 et seq., S.C. Code of Laws, 1976, as amended.)**

The State of South Carolina has established ambient air quality standards (SCAAQS) for the State that also applies to the study area (see Section 4.13 – Air Quality). The SCAAQS include the same pollutants and criteria as the NAAQS, and in addition include Gaseous Fluorides (as hydrogen fluorides). A State Implementation Plan (SIP) is developed and used to determine ways the NAAQS and State Ambient Air Quality Standards will be achieved or maintained. The SIP for South Carolina identifies the ways in which NAAQS will be achieved or maintained within the State, including the Proposed Project. SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

**Protection of Game – Section 50-11-10 et seq., S.C. Code of Laws**

This law formally adopted the Federal Migratory Bird Treaty Act and codified prohibitions concerning hunting of waterfowl and leveling penalties. The board of SCDNR annually may set seasons, bag limits, and methods for hunting and taking migratory birds consistent with Federal law. A violation of the Migratory Bird Treaty Act or its implementing regulations or a violation of regulations set by the board is a misdemeanor. Migratory birds have been documented within the Vegetation and Wildlife study area (see Section 3.4 – Vegetation and Wildlife), therefore the law applies. SCDNR would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

**Nongame and Endangered Species Act – Section 50-15-10 et seq., S.C. Code of Laws**

This law gave authority to the SCDNR to issue regulations and develop management programs designed to ensure the continued ability of nongame wildlife to perpetuate themselves successfully. Regulations outline species or subspecies of nongame wildlife which the department deems in need of management, giving their common and scientific names by species or subspecies. The department also established proposed limitations relating to taking, possession, transportation, exportation, processing, sale or offer for sale, or shipment as may be deemed necessary to manage such nongame wildlife.

It is unlawful for any person to take, possess, transport, export, process, sell, or offer for sale or ship nongame wildlife deemed by the department to be in need of management under this law. Subject to the same exception, it shall further be unlawful for any common or contract carrier knowingly to

transport or receive for shipment nongame wildlife deemed by the department to be in need of management pursuant to this law. Nongame wildlife subject to this law have been documented within the Vegetation and Wildlife study area (see Section 4.4, Vegetation and Wildlife, and Section 4.6, Protected Species), therefore the law applies. SCDNR would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

#### **State Underground Petroleum Environmental Response Bank Act – Section 44-2-10 et seq., S.C. Code of Laws**

This Act directed the SCDHEC to develop regulations relating to permitting, release detection, prevention, and correction applicable to all owners and operators of underground storage tanks (USTs) as may be necessary to protect human health and the environment. These regulations for USTs include requirements for submitting a permit application and obtaining permits before the installation and operation of an UST; requirements for taking corrective action in response to a release from an UST; and requirements for the closure of tanks to prevent future releases of regulated substances into the environment. The study area may currently have USTs and there is the potential for use of new USTs for petroleum and other substances of concern (see Section 4.15 – Hazardous Waste and Materials). SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

#### **Hazardous Waste Management Act – Section 44-56-10 et seq., S.C. Code of Laws**

This Act directed the SCDHEC to develop regulations relating to procedures or standards as may be necessary to protect the health and safety of the public, the health of living organisms and the environment from the effects of improper, inadequate, or unsound management of hazardous wastes. Such regulations prescribe contingency plans; the criteria for the determination of whether any waste or combination of wastes is hazardous; the requirements for the issuance of permits required; standards for the transportation, containerization, and labeling of hazardous wastes consistent with those issued by the United States Department of Transportation; operation and maintenance standards; reporting and record keeping requirements; and other appropriate regulations. Construction of the Proposed Project will involve excavation activities that may result in involvement with contaminated soils and storage and use of hazardous materials such as solvents may be required. Also, it is anticipated that a relatively low number of containers coming into the ICTF will contain hazardous materials (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste). SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

### **South Carolina Solid Waste Policy and Management Act – Section 44-96-10 et seq., S.C. Code of Laws.**

This law's intent is to protect the public health and safety, protect and preserve the environment of this State, and recover resources which have the potential for further usefulness by providing for, in the most environmentally safe, economically feasible and cost-effective manner, the storage, collection, transport, separation, treatment, processing, recycling, and disposal of solid waste. The Proposed Project will generate solid waste from construction and operation (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste). SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

### **Occupational Health and Safety Act – Section 41-15-10 et seq., S.C. Code of Laws**

This Law governs occupational health and safety. Employers are required to provide employment and a place of employment that are “free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees...”. The Department of Labor, Licensing, and Regulation was directed by this Act to issue regulations requiring employers to monitor and measure an employee's exposure to potentially toxic materials or harmful physical agents and to maintain accurate records of such employee exposure.

The Proposed Project will require demolition/renovation of buildings where asbestos-containing materials and metals-based paints have been detected above their regulatory thresholds. Also, contaminated soil may be encountered during construction. Proper worker protection will be required during construction (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste). The SC Department of Labor, Licensing, and Regulation would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

### **Standards of Performance for Asbestos Projects – Regulation 61-86.1 (Statutory Authority: Sections 44-1-140; 48-1-30; 44-87-10 et seq. S.C. Code of Laws, 1976, as amended.)**

This regulation applies to: any owner/operator, asbestos abatement entity, building inspector, management planner, project designer, contractor, asbestos abatement entity, air sampler, commercial labor provider, supervisor, worker, non-industrial facility owner and/or operator, demolition contractor involved in the inspection, in-place management, design, removal, renovation, encapsulation, enclosure, repair, clean-up, demolition activity, or any other disturbance of regulated asbestos-containing material (RACM); and any asbestos training course provider or asbestos training course instructor who conducts mandatory asbestos training courses.

The Proposed Project will require demolition/renovation of buildings where asbestos-containing materials have been detected above their regulatory thresholds (see Section 4.15 – Hazardous, Toxic,

and Radioactive Waste). The SCDHEC's Asbestos Section would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

### 8.3 LOCAL LAWS AND REGULATIONS

#### **The Zoning Ordinance of the City of North Charleston, South Carolina – (North Charleston, South Carolina Code of Ordinances, Appendix A)**

City of North Charleston has enacted and ordained the zoning ordinance of the city for the purposes of guiding development in accordance with existing and future needs, preserving and enhancing the present advantages of the city and the community, overcoming present handicaps and preventing or minimizing such future problems as may be foreseen, promoting efficiency and economy in the process of development or redevelopment of the city, protecting, promoting, and improving the public health, safety, morals, convenience, order, appearance, prosperity, and general welfare, lessening congestion in the streets and making adequate provision for traffic, promoting safety from fire, panic and other dangers, promoting health and general welfare, providing adequate light and air, preventing the overcrowding of land, avoiding undue concentration of population and promoting the healthful and convenient distribution of population, protecting scenic areas, promoting good civic design, appearance and arrangement, and promoting wise, adequate and efficient expenditure of public funds and resources and the adequate provision of public utilities, transportation, water, sewage, schools, parks and other public requirements. The city council of North Charleston is authorized to regulate the height, bulk, number of stories and size of buildings and other structures, the percentage of lot which may be occupied, the size of yards, courts, and other open spaces, the density and distribution of population, and the location and use of buildings, structures and land for trade, industry, residence, recreation, agriculture, forestry, conservation, airports and approaches thereto, water supply, sanitation, protection against floods, public activities, and other purposes, the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land, including requirements of off-street parking and loading, landscaping and protection and regulation of trees in consideration of their value from an environmental, agricultural, aesthetic, scenic or preservation standpoint, taking into account, among other items, the character of the area in which the property is located and its peculiar suitability for particular uses, the conservation of value of land and buildings and the encouragement of the most appropriate use of land, buildings and structures, the promotion of desirable living conditions and the sustained stability of neighborhoods, the protection of property against blight and depreciation, the securing of economy in governmental expenditures, and the encouragement of the most appropriate use of land throughout the city.

There are many sections of the zoning ordinance that would apply to the Proposed Project including, but not limited to, the regulation of trees, protecting scenic areas, flood protection, stormwater, building setbacks, building heights and massing, signage, and traffic considerations (see Section 4.2 – Hydrology, Section 4.4 – Vegetation and Wildlife, Section 4.9 – Land Use and Infrastructure, and Section 4.11 – Visual Resources and Aesthetics). Several applicable sections of the zoning ordinance



are covered below. The City of North Charleston would be responsible for ensuring that the Proposed Project was consistent with the zoning ordinances.

#### **City of North Charleston District Use Classification – Planned Development District (North Charleston, South Carolina Code of Ordinances, Article V, Section 5)**

The Planned Development District is a special district established by a certain procedure and designated on the official zoning map by boundaries and symbols. Use, area, bulk, height, and other requirements are determined by the procedures in the code of ordinances. The intent of the ordinance is to encourage flexibility in the development of land in order to promote its most appropriate use; to improve the design, character, and quality of new development; to facilitate the adequate and economical provision of streets and utilities; and to preserve the natural and scenic features of open areas. The City of North Charleston is the responsible agency and the rules would apply because a portion of the Proposed Project falls within a Planned Development District (see Section 4.9 – Land Use and Infrastructure).

#### **City of North Charleston Zoning Regulations (Tree Protection and Riparian Buffers) – (North Charleston, South Carolina Code of Ordinances, Appendix A, Article VI, Section 6-16 and 6-17)**

The tree protection ordinance's purpose is to preserve existing trees of eight (8) inches in diameter or greater at breast height and generally prevent the clear cutting of sites, a practice which destroys the balance of nature, leads to sedimentation and erosion, contributes to air and water pollution, and unnecessarily robs the community of valuable natural resources. The riparian buffer ordinance's purpose is to maintain stream habitats and associated vegetation for the purposes of maintaining the physical, chemical and biological integrity of water resources; providing vital natural filtration of stormwater; reducing erosion and controlling sedimentation; stabilizing stream banks; maintaining tidal and stream flows; improving aquatic and terrestrial wildlife habitats; maintaining scenic value and recreational opportunities; and mitigating the impacts of flooding and tropical storms. Construction of the Proposed Project will result in the clearing of trees and will require permits from the City of North Charleston (see Section 4.4 – Vegetation and Wildlife).

#### **City of North Charleston Stormwater Management Program (North Charleston, South Carolina Code of Ordinances, Appendix A, Article VII, Section 7-2.2)**

The City of North Charleston has a Stormwater Management Program that is consistent with the Federal CWA, South Carolina Pollution Control Act, and South Carolina Stormwater Management and Sediment Reduction Regulations. The goal of the program is to reduce the amount of runoff pollution that eventually makes its way into local waters. Most land-disturbing construction activities in the City require a Stormwater Permit. The City has guidance in the form of a Stormwater Permitting and Design Manual (City of North Charleston 2008b).

A Construction Permit is required for all new single-family residential construction, new development, and redevelopment projects that disturb 5,000 square feet or more. All Construction Permit applications can be made, as necessary, to the City of North Charleston's Public Works Department. The Proposed Project, being greater than five acres, would fall under a Type III permit application.

The City of North Charleston has general design standards that must be incorporated into BMPs for projects within their jurisdiction. Incorporation of the general design standards constitutes adequate control of the discharge of pollutants. The City of North Charleston is the responsible agency for this requirement. The Proposed Project would disturb more than 5,000 square feet; therefore a permit would be required (see Section 4.3 – Water Quality).

#### **City of North Charleston Flood Damage Prevention Regulations (North Charleston, South Carolina Code of Ordinances, Ch. 5, Article V)**

The City of North Charleston adopted an ordinance revising and amending the city's flood damage prevention regulations to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas. The provisions were designed to restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities. It also requires that structures vulnerable to floods, including appurtenant structures, be protected against flood damage. The City of North Charleston is the responsible agency and the regulations would apply because portions of the Proposed Project falls within floodplains (see Section 4.2 – Hydrology).

#### **Settlement Agreement and Release (Civil Action No: 2011-CP-10-491, 2011-CP-10-493, 2011-CP-10-494, 2011-CP-10-555C, 2011-CP-10-3147),**

A Memorandum of Understanding and Agreement (MOUA) was signed by the SCPA and the City of North Charleston, where the City would develop the northern portion of the former CNC site and SCPA would develop the southern portion of the site (Port Facility Area). The MOUA further specified "that certain minimum infrastructure must be in place before the SCPA commences container operations." This minimum infrastructure included a truck access road from the Port Facility Area to I-26, as well as several rail overpasses. This MOUA would apply to the Proposed Project. The SCPR and the City of North Charleston would be the responsible parties.

#### **Site Clearing Permits (Charleston, South Carolina Code of Ordinances, Section 7-10)**

This section of the Charleston Code of Ordinances requires for a clearing permit to be issued by the chief building official in instances where land within the city will be cleared of vegetation. This includes altering the contour of the land or any trees or shrubs located on the respective property. Routine maintenance of trees or shrubs and routine sodding are not required to have a clearing

permit. Other exceptions to this permitting process are utility companies, electric suppliers, and governmental agencies who are constructing or maintaining easements for water, sewer, electricity, gas, drainage, telephone or television transmission or rights-of-way. However, these companies, suppliers, or agencies must complete an agreement with the city in which certain standards and lines of communication must occur. The City of Charleston is the responsible agency and the regulations would apply because vegetation will be cleared as a result of the Proposed Project.

### **Stormwater Management and Flood Control (Charleston, South Carolina Code of Ordinances, Ch. 27 )**

Chapter 27 of the Charleston Code of Ordinances describes the stormwater management and flood control programs that are instilled in this particular city. The purpose of this chapter is to protect, maintain, and enhance water quality and the environment of the city and the short-term and long-term public health, safety, and general welfare of the citizens of the city. Another purpose is to minimize property damage by establishing requirements and procedures to control the potential adverse effects of increase stormwater runoff and related pollutant loads associated with both future development and existing developed land. A Stormwater Design Standards Manual has been created as part of this Chapter, and should be referenced to understand the design standards, procedures, and criteria for conducting hydrologic, hydraulic, pollutant load evaluations, and downstream impact for all components of the stormwater management system. Regular inspections conducted by the department of public service will occur to ensure compliance of stormwater and flood control regulations. The City of Charleston will require a Type III building permit application because the Proposed Project will disturb an area that is five acres or greater (see Section 4.3 – Water Quality). The Type III application will need to include (among other items): a stormwater technical report, specifications for all components of construction activities related to grading, utilities, sediment and erosion control, temporary and permanent vegetation, and water quality BMPs, and a stormwater master plan.

### **City of Charleston Zoning Ordinance**

The Zoning Ordinance of Charleston aims to preserve the historic city and its neighborhoods, manage tourism impacts, and protect the city's natural setting while accommodating growth and enabling economic development. This ordinance establishes a zoning map that includes 44 base zoning districts, 12 overlay zoning districts, 16 Old City height districts, 62 Planned Unit Developments, and 4 Neighborhood Districts. Listed below are the titles of the major Articles that are included in this ordinance.

- General Provisions
- Land Use Regulations
- Site Regulations
- Sign Regulations

- Exceptions and Modifications
- Land Development Plan Review
- Official Road Plan
- Subdivision, Property Line Adjustment or Abandonment
- Administration and Enforcement

Appendices that discuss various other topics, such as rules for zoning boards and commissions is also included in this ordinance. The City of Charleston is the responsible agency and the regulations would apply because all development within city limits must comply with all elements of the zoning ordinance (see Section 4.9 – Land Use and Infrastructure).

#### **Tree Protection Requirements (Charleston Zoning Ordinance, Article 3, Part 6)**

The intention behind this section is to protect trees by regulating the cutting down, damaging, planting and replacement of trees. It is not however intended to prohibit agriculture, silviculture, horticulture, or nursery operations within the city. Certain operations are exempt from these requirements. Tree removal restrictions and tree survey requirements are to be upheld, as well as standards for approval to remove trees. During construction activities, tree protection requirements must be met while also adhering to specific requirements for tree replacement, relocation, planting, and maintenance requirements. A table that includes tree species that are categorized by ratings taken from the Tree Species Rating Guide (March 2001) developed by the Southern Chapter of the International Society of Arboriculture is also included in this section for mitigation purposes. The City of Charleston is the responsible agency and the regulations would apply because trees will be removed as a result of the Proposed Project. (see Section 4.4 – Vegetation and Wildlife)



## 9.0 PUBLIC, AGENCY, AND STAKEHOLDER COORDINATION AND CONSULTATION

### 9.1 PUBLIC AND STAKEHOLDER COORDINATION

The Corps has provided several opportunities and mechanisms to share and receive information with the public, stakeholders, governmental agencies, tribes, and non-governmental organizations (NGOs). Opportunities and mechanisms for information sharing include:

- **Scoping process** that included two public scoping meetings and two 30-day comment periods to solicit input on the scope of the analysis and alternatives to be evaluated in the EIS;
- **Public meetings** to present project updates and receive feedback from the public and stakeholders, including distribution of **facts sheets and brochures** to provide information and facilitate public input;
- Participation in **community and stakeholder meetings**, including neighborhood association meetings;
- Development and maintenance of a **project website** ([www.NavyBaseICTF.com](http://www.NavyBaseICTF.com)) that includes pertinent project information such as meeting announcements, copies of meeting materials, publicly released project documents, project status reports, and information and mechanisms for public comment; and
- Distribution of “Navy Base ICTF EIS News,” the **project-developed newsletter** designed to inform the public of progress during the preparation of the EIS, via hard copy mail-out and electronic distribution.

A chronological summary of these activities is included in Table 9.1-1.

Table 9.1-1  
Chronological summary of public and agency involvement activities (2013–2016)

Activity	Date(s)
The U.S. Army Corps of Engineers (Corps) published a Notice of Intent (NOI) to prepare an environmental impact statement (EIS) for the Proposed Project in the <i>Federal Register</i> .	October 23, 2013
The Corps published a Public Notice to inform the public and to request comments about the proposal from the South Carolina Department of Commerce Division of Public Railways d/b/a Palmetto Railways (Palmetto Railways) for a Department of the Army (DA) permit.	October 25, 2013
The Corps mailed a Public Notice letter to adjacent landowners and other interested parties to announce the public scoping meeting.	October 25, 2013
The Corps initiated agency and tribal consultations by mailing the Public Notice to Federal and State agencies and the Catawba Indian Nation.	October 25, 2013
The Corps launched the Navy Base Intermodal Container Transfer Facility (ICTF) EIS project website to provide an opportunity for the public to sign up for the project mailing list and submit written comments throughout the preparation of the EIS.	October 25, 2013
The Corps published a meeting announcement in the <i>Post and Courier</i> newspaper with information on the Proposed Project and the Public Scoping Meeting.	November 3 and 10, 2013
The Corps published a meeting announcement in the <i>Charleston Chronicle</i> newspaper with information on the Proposed Project and the Public Scoping Meeting.	November 6, 2013
The Corps provided a public scoping comment period.	November 14, 2013 – December 14, 2013
The Corps held a public scoping meeting.	November 14, 2013
The Corps held a meeting with the BCDCOG, SCDOT, and Palmetto Railways to discuss the scope of the Transportation Study for the EIS.	November 22, 2013
The Corps published a Public Notice to inform the public of the community meeting.	April 15, 2014
The Corps published a meeting announcement in the <i>Post and Courier</i> newspaper with information on the community meeting.	April 27 and May 4, 2013
Letter received from NMFS identifying EFH habitat in the project site and EFH for the brown shrimp ( <i>Farfantepenaeus aztecus</i> ) and white shrimp ( <i>Litopenaeus setiferus</i> ).	April 23, 2014
The Corps published a meeting announcement in the <i>Charleston Chronicle</i> newspaper with information on the community meeting.	April 30, 2014
The Corps held a community meeting to discuss the studies and alternatives that will be included in the EIS.	May 6, 2014
The Corps published a Scoping Report on the Navy Base ICTF EIS website containing information on the scoping process and comments received.	May 6, 2014
The Corps held separate local interviews with BCDCOG, LAMC, Metanoia, and the City of North Charleston.	May 7, 2014
Reports of architectural and archaeological surveys undertaken for Palmetto Railways in 2011 were submitted to the State Historic Preservation Officer (SHPO) for review.	June 2014
The SHPO concurred with the identification of historic properties and the adequacy of the coverage of the areas examined in the architectural and archaeological surveys.	July 24, 2014

Activity	Date(s)
The Corps attended the Chicora-Cherokee Neighborhood Council meeting, provided a brief background on the project, and listened to comments from the neighborhood residents.	July 28, 2014
The Corps attended the Union Heights monthly neighborhood meeting, provided a brief background on the project, and listened to comments from the neighborhood residents.	August 12, 2014
The Corps attended the monthly neighborhood meeting for Olde North Charleston, Palmetto Gardens, Cameron Terrace, and North East Park Circle (combined meeting to discuss this project), provided a brief background on the project, and listened to comments from the neighborhood residents.	August 13, 2014
The Corps held a meeting with the BCDCOG, SCDOT, SCPA, City of North Charleston and Palmetto Railways to provide a status update on the Transportation Study for the EIS.	October 23, 2014
The Corps distributed the first issue of <i>Navy Base ICTF EIS News</i> , a newsletter designed to inform the public of progress during the preparation of the EIS.	October 31, 2014
2014 Cultural Resource Surveys undertaken for Palmetto Railways in support of the proposed ICTF were submitted to the SHPO for review.	November 2014
The SHPO concurred with the survey results and recommendations of eligibility for individual resources.	December 3, 2014
The U.S. Coast Guard determined that the proposed bridge project over Noisette Creek will not require a Coast Guard bridge permit.	January 14, 2015
Palmetto Railways submitted a revised proposal to the Corps which included the construction of two new connections to the local rail network	September 8, 2015
The Corps published a Public Notice to inform the public and to request comments about the revised proposal from Palmetto Railways.	September 25, 2015
The Corps distributed a Public Notice letter to members of the Navy Base ICTF mailing list to explain changes to the Proposed Project and to announce the second public scoping meeting.	September 25, 2015
The Corps held a meeting with the BCDCOG to provide an update on Palmetto Railways' revised proposal.	October 6, 2015
The Corps published a meeting announcement in the <i>Charleston Chronicle</i> newspaper with information on revisions to the Proposed Project and the second Public Scoping Meeting.	October 14 and October 21, 2015
The Corps published a meeting announcement in the <i>Post and Courier</i> newspaper with information on revisions to the Proposed Project and the second Public Scoping Meeting.	October 18 and October 25, 2015
The Corps held a second public scoping meeting on the revised Proposed Project.	October 27, 2015
The Corps provided a second public scoping comment period.	October 27, 2015 – November 27, 2015
The Corps met with the owners of Salmons Dredging Company and Marinex Construction.	December 10, 2015
The Corps granted consulting party status to the Historic Charleston Foundation, the Preservation Society of Charleston, and the Naval Order of the United States.	January 19, 2016
The Corps met with several tenants of the 1799 Meeting St Road professional complex (eLifespaces and Tecklenburg and Jenkins LLC).	January 27, 2016
The Corps attended a Hunley Waters Neighborhood Association meeting.	February 1, 2016
The Corps attended the annual Metanoia Town Hall meeting.	February 8, 2016

Activity	Date(s)
The Corps published an addendum to the Scoping Report on the Navy Base ICTF EIS website containing information on the second scoping process and comments received.	February 12, 2016
As a result of Palmetto Railways' September 2015 revised proposal, an additional architectural survey was submitted to the SHPO for review.	Date TBD

### 9.1.1 Scoping Process

Participation by the public, governmental agencies, tribes, and NGOs is critical to the NEPA process. The purpose of scoping under NEPA is to ensure participation of interested parties, such as Federal, State, tribal, and local government agencies and officials, property owners, residents and other stakeholders to determine the scope of issues to be addressed and to identify the significant issues to be analyzed in depth related to the proposed action (40 CFR 1501.7). This participation is intended to help identify resources and other issues that are of critical importance to agencies and the public. This process also serves to deemphasize insignificant issues, narrowing the scope of the EIS process accordingly (40 CFR 1500.4(g)). Scoping results in the identification of the range of actions, alternatives, and impacts to be considered in the EIS (40 CFR 1508.25). Furthermore, the scoping process is intended to:

- Encourage interested parties to participate in the preparation of the Navy Base ICTF EIS project design and scope;
- Provide early public access to information about the Proposed Project;
- Solicit information and comments from interested parties; and
- Facilitate effective communication between the Corps and interested parties.

A Notice of Intent (NOI) was published in Vol. 78, No. 205 *Federal Register* (78 FR 205, PP. 63169-63170), on October 23, 2013. The NOI announced the Corps' intention to prepare an EIS to assess the potential social, economic, and environmental effects of the proposed construction and operation of an ICTF by Palmetto Railways. The NOI provided the public with a description of the Proposed Project; an explanation of alternatives, the scoping and public involvement process, significant issues associated with the Proposed Project, and the review and consultation process; and the expected availability of the Draft EIS. Approximately 450 State and Federal agencies, elected officials, interest groups, and the general public were notified by email that a local Public Notice was available on either the Charleston District's website or on the ICTF project website. In addition, a letter was mailed to adjacent landowners and other interested parties on October 25, 2013, providing information about the scoping meeting and encouraging recipients to attend and offer their input. Meeting announcements were advertised in *The Post and Courier* (on November 3, 2013, and November 10, 2013) and the *Charleston Chronicle* (November 6, 2013). The 30-day scoping period was open from November 14, 2013, to December 14, 2013.



On September 8, 2015, Palmetto Railways submitted a revised proposal that included the construction of two new connections to the local rail network. A Public Notice announcing the changes to the Proposed Project and a second public scoping meeting was issued on September 25, 2015. On the same day that the Public Notice was issued, the Corps distributed a newsletter to the approximately 485 members of the Navy Base ICTF mailing list to explain changes to the Proposed Project and to announce the second public scoping meeting. Meeting announcements were advertised in *The Post and Courier* (on October 18, 2015 and October 25, 2015) and the *Charleston Chronicle* (on October 14, 2015 and October 21, 2015). The Corps conducted the second public scoping meeting on October 27, 2015. The 30-day scoping period for the second scoping meeting was open from October 27, 2015 to November 27, 2015.

During both the 2013 and 2015 scoping periods, comments received included written comments provided to the Corps via comment cards or flyers during the scoping meeting, formal verbal comments given at the public scoping meeting and transcribed by a court reporter, comments submitted through the Navy Base ICTF EIS project website or emailed directly to the Corps, and comments mailed directly to the Corps. In total, approximately 120 comments were received during the first scoping period, and 123 comments were received during the second scoping period. Comments were received from residential community members, local business owners, and Federal, State, and local agencies/officials such as the USEPA, USFWS, SCDHEC, and the Cities of Charleston and North Charleston. NGOs such as the Charleston Motor Carrier Association, Charleston WaterKeeper, LAMC, Metanoia CCRAB, Maritime Association of South Carolina, Historic Charleston Foundation, the Preservation Society of Charleston, and the Naval Order of the United States also provided comments. Additional comments were received from local businesses, including CSX Transportation, Marinex Construction, Salmons Dredging Company, eLifespaces, and Tecklenburg and Jenkins, LLC.

Each comment was reviewed and then sorted into one of 24 categories, most of which correspond to the resource categories to be evaluated in the EIS. The 24 categories above were grouped into five larger categories (NEPA, Socioeconomics, Land Use and Infrastructure, Physical and Cultural Resources, and Natural Resources) for the purpose of summarization. Comments included an anticipation of both positive and negative impacts due to the project and suggested that additional studies may be warranted. Details regarding the comments received during the scoping periods can be found in the Scoping Report and Addendum #1 to the Scoping Report (Appendix C). All comments received were considered both individually and collectively during preparation of the DEIS.

### 9.1.2 Public Meetings

Three public meetings were held during the DEIS development period. A public scoping meeting was held on November 14, 2013, a community meeting was held on May 6, 2014, and a second public scoping meeting was held on October 27, 2015. All venues were selected on the basis of convenience to the public in the primary region affected by the proposed action, their capacity, and accessibility.

The first public scoping meeting was held at the Chicora School of Communications (former Ronald C. McNair Elementary School). One hundred and one people signed in at the welcome station for the scoping meeting; however, several individuals elected not to sign the attendance sheet. The meeting began with an informal open house during which the public could visit information stations with displays and handouts available for viewing. Subject matter experts from the Project Team (Corps, the third-party contractor, and staff from Palmetto Railways) were present to answer questions regarding the Proposed Project and NEPA process, and to solicit comments from the meeting participants. Poster boards were used to display information about the Proposed Project, potential environmental issues, and the NEPA process. In addition, a welcome station and court reporter station were available to accept oral and written comments. Comment cards were available at several locations for attendees to fill out and submit during the meeting.

The formal part of the scoping meeting began with a presentation by the District Engineer for the Charleston District, Lt. Col. John T. Litz, and a welcoming by Mr. Jeff McWhorter, President and Chief Executive Officer (CEO) of Palmetto Railways. The former Corps project manager, Nat Ball, described the Proposed Project, the NEPA process, a general timeline for the preparation of the Draft EIS, and opportunities for public involvement and comment provided during the NEPA process. Following the presentations, members of the public were invited to make oral comments in the presence of a court reporter. A total of 13 people made oral comments.

The community meeting was held May 6, 2014, at the Military Magnet Academy. The purpose of this community meeting was to update the public on the progress on the EIS, and to allow for open and informal discussion between members of the community, interested parties, and the Project Team. The meeting topics included screening criteria to be used in the development of alternatives, and resource-specific studies that will be conducted to assess impacts of the project. Information was presented on posters and the Project Team was available to discuss project details and to answer questions. One hundred and thirteen people signed in at the welcome station for the scoping meeting; however, several individuals elected not to sign the attendance sheet. Written comments were accepted at the community meeting and via the website.

The second public scoping meeting was held at the Military Magnet Academy Cafeteria on October 27, 2015. One hundred and ninety seven people signed in at the welcome station for the scoping meeting; however, several individuals elected not to sign the attendance sheet. The meeting began with an informal open house from 5:00 P.M. to 7:00 P.M. Information stations with displays and handouts were available for viewing. Subject matter experts from the Corps and the third-party contractor (Atkins) were present to answer questions about the NEPA process and to solicit comments from meeting participants. Staff from Palmetto Railways were also present to answer questions about their Proposed Project. Poster boards were used to display information about the Proposed Project, potential environmental issues, and the NEPA process. A visual simulation showing key components of the revised project site was projected on a screen in the center of the room. In

addition, a welcome station and court reporter station were available to accept oral and written comments. Comment cards were available at several locations for attendees to fill out and submit during the meeting.

The Deputy District Engineer for the Charleston District, Major Nathan Molica, began the formal part of the scoping meeting with a presentation at 7:00 P.M. Major Molica's presentation introduced the NEPA process and the Corps' role in the process, gave a general timeline for the preparation of the DEIS, established the purpose of the scoping meeting, and explained the opportunities for comment that were available to the public during the scoping period. The former Corps project manager, Nat Ball, described the purpose and history of the Proposed Project, and elaborated on both the changes to the Proposed Project and the Corps' role in the NEPA process. Mr. Jeff McWhorter provided additional information about the purpose of the Proposed Project and the changes to the plans since the 2013 scoping meeting. Following the presentations, members of the public were invited to make oral comments in the presence of a court reporter. A total of 18 people made oral comments. Additionally, 4 people signed up to speak but either had questions rather than comments, chose not to speak because someone else had already voiced their concerns, or chose to submit their comments in written format; 4 people signed up to speak but did not respond when their name was called.

### 9.1.3 Community and Stakeholder Meetings

A Chicora-Cherokee Neighborhood Council Meeting was held on July 28, 2014, at Sterret Hall in North Charleston which allowed for sharing of information and a forum for discussion concerning the Proposed Project and the EIS. Many questions and concerns were raised at the meeting at which there were 27 attendees. Statements were made by local residents as well as by SC Senator Marlon Kimpton, neighborhood president AJ Davis and Reverend Bill Stanfield of Metanoia.

The Navy Base ICTF project was one of the last items for discussion at the regularly scheduled Union Heights neighborhood meeting on August 12, 2014. The project display boards were set up for discussion purposes and former Corps project manager, Nat Ball, presented background information on the Proposed Project. There were approximately 10 people in attendance. Many questions and comments were raised which reflected concern about the impact of the project on the community and its rich cultural history.

A combined meeting of the Olde North Charleston, Palmetto Gardens, Cameron Terrace, and North East Park Circle neighborhoods was held on August 13, 2014, at the Olde Village Community Center. This was an informational meeting with approximately 25 attendees, including North Charleston Council Member Bob King, Ray Anderson from the Mayor's Office, and Charleston County School District Board Chair Cindy Coats. Discussion focused on the Navy Base ICTF project display boards that were set up at the meeting.

The Corps met with the owners of Salmons Dredging Company and Marinex Construction in separate meetings that took place on December 10, 2015. These business owners were concerned about the September 2015 project revision which resulted in the southern connection. Their comments during the meeting focused on the current and future access to and from their businesses in the context of train schedules and intersection blockages at Pittsburgh Avenue and Cherry Hill Lane.

The Corps met with several tenants of the 1799 Meeting St Road professional complex, including eLifespaces and Tecklenburg and Jenkins LLC, in a joint meeting that took place on January 27, 2016. Richard Darden, the Corps project manager, provided an overview of the Proposed Project. The remainder of the meeting consisted of a question and answer session. Questions and comments were expressed on a variety of topics related to the Proposed Project, including the NEPA process, project alternatives, and traffic.

A Hunley Waters Neighborhood Association meeting took place on February 1, 2016, at a private home within the Hunley Waters Neighborhood. Richard Darden, the Corps project manager, provided an overview of the Proposed Project. The remainder of the meeting consisted of a question and answer session. Questions and comments were expressed on a variety of topics related to the Proposed Project, including the NEPA process, air quality, noise, and land use.

A town hall meeting was held on February 8, 2016, by Metanoia at the Fellowship Hall of St. Matthew Baptist Church in North Charleston. Metanoia is an organization focused on building youth leadership, establishing quality housing and generating economic development in and around the Chicora Cherokee neighborhood in North Charleston. Approximately 40 Metanoia stakeholders asked questions about the Proposed Project and discussed concerns on topics including air quality, noise, traffic, and relocations.

#### 9.1.4 Consulting Parties

Consulting party status pursuant to Section 106 of the NHPA was requested by the Historic Charleston Foundation, the Preservation Society of Charleston, and the Naval Order of the United States in three separate letters received by the Corps during the 2015 public scoping period. The Corps granted these entities consulting party status on January 19, 2016.

#### 9.1.5 Project Website

A Navy Base ICTF EIS website ([www.NavyBaseICTF.com](http://www.NavyBaseICTF.com)) was developed for the project on October 25, 2013. Information provided on the website includes project updates, a project overview, an explanation of the NEPA process, supporting documents, and information about the public's opportunities to participate in preparation of the EIS. The website also provides an opportunity for the public to sign up for the project mailing list and to submit written comments throughout the preparation of the EIS.



### 9.1.6 Project Newsletter

A project newsletter, *Navy Base ICTF EIS News*, was developed to assist in the dissemination of information and provide updates on the EIS. The newsletter is distributed as hard copy mail-outs and electronically to the project email distribution list. The first issue, fall 2014, provided an update on the project changes per Palmetto Railways' revised proposal. The second issue, fall 2015, provided an update on the project changes per Palmetto Railways' revised proposal and announced the second scoping meeting. Copies of the newsletters are available on the project website ([www.NavyBaseICTF.com](http://www.NavyBaseICTF.com)).

### 9.1.7 Community Engagement

Throughout the scoping process and during preparation of the draft EIS, several steps were taken to encourage the participation of local community members. Public and community meetings were publicized through local media, by posting signs in the neighborhood, and through engagement with active local community organizations.

As identified in Section 3.16.2.5, approximately 40 percent of the population in several neighborhoods near the Proposed Project do not have a high school diploma (part of Chicora-Cherokee and River Place Apartments). To engage local community members with low levels of educational attainment at the scoping meetings, Corps representatives made themselves available to receive oral comments from citizens and wrote on large notepads, the concerns expressed by community members in attendance. The Corps also made hard copies of project maps available to citizens that lacked means to access the project web site.

As described in Section 3.16.2.4, the study area does not meet the U.S. Department of Justice's Safe Harbor threshold for presence of a LEP population. Therefore, translation of vital documents was not provided at community meetings or on the project web site.

## 9.2 AGENCY COORDINATION AND CONSULTATION

### 9.2.1 Cooperating Agencies

Per CEQ regulation 40 CFR 1508.5, a *Cooperating Agency* is any Federal agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a Proposed Project or project alternative. For the proposed Navy Base ICTF project, the USEPA and the FRA, under the DOT, have agreed to act as cooperating agencies on the EIS. These agencies participate in bi-weekly project team calls with the Corps and Palmetto Railways and in public/agency/stakeholder meetings as availability allows. Palmetto Railways has indicated that it will submit a FRA Railroad Rehabilitation & Improvement Financing (RRIF) loan application. Should Palmetto Railways decide to apply for a loan under FRA's RRIF program for the Proposed Project, FRA would have to consider the potential environmental impacts resulting from the Proposed Project

when making a decision on the loan application. Additional information on FRA's responsibilities in the event of receipt of an application for a RRIF loan can be found in Section 1.3.4.2. Additionally, the Corps met with the USEPA at the beginning of the EIS to provide background and details about the project and to discuss the scopes of work for the Community Impact Assessment and air quality study to be conducted.

### 9.2.2 Agency Coordination and Consultation

The Corps initiated agency and tribal consultations on October 25, 2013, by sending a hard copy of the public notice to Federal and State agencies and the Catawba Indian Nation.

In response to the public notice, letters were received from the USFWS, SCDHEC, City of North Charleston Housing Authority, and USEPA indicating their specific involvement in the project and desire for coordination throughout the duration of the project (included in Appendix C: Scoping Report).

In June 2014, reports of architectural and archaeological surveys undertaken for Palmetto Railways in 2011 were submitted to the SHPO for review with respect to the adequacy of the survey coverage and the identification of historic properties (included in Appendix G). These reports offered assessments of effect with respect to the project site configured at that time. On July 24, 2014, the SHPO concurred with the findings of the reports with respect to the identification of historic properties and the adequacy of the coverage of the areas examined. This coordination resulted in a determination of areas within the study area that required additional inventory to identify historic properties. Additional surveys within the study area and an assessment of NRHP eligibility of potential Cold War era resources within the CNC was completed in September 2014 and sent to SHPO for review. On December 3, 2014, the SHPO concurred with the survey results and recommendations of eligibility for individual resources. As a result of Palmetto Railways' September 2015 revised proposal, an additional architectural survey was submitted to the SHPO for review in February 2016 (Appendix G).

On April 23, 2014, a letter was received from NMFS which identified EFH habitat in the project site and EFH for the brown shrimp (*Farfantepenaeus aztecus*) and white shrimp (*Litopenaeus setiferus*) (included as Appendix B in Appendix E: EFH Assessment). An EFH Assessment has been prepared for the Proposed Project and will be sent to the NMFS for review (Appendix E).

On November 22, 2013, the Corps held a meeting with the BCDCOG, SCDOT, and Palmetto Railways to discuss the scope of the Transportation Study for the EIS. Another meeting was held on October 23, 2014, to gather input and discuss the status of the Transportation Study for the EIS. On October 6, 2015, the Corps held a meeting with the BCDCOG to provide an update on Palmetto Railways' revised proposal. Coordination with the BCDCOG and SCDOT will be ongoing throughout the EIS process.

In a letter to the Corps dated January 14, 2015, the U.S. Coast Guard determined that the proposed bridge project across Noisette Creek will not require a Coast Guard bridge permit; however, other U.S. Coast Guard stipulations apply.

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The following definitions are for the convenience of those reading this Environmental Impact Statement and do not replace definitions in State, Federal, or local laws, regulations, and ordinances.

**100-year floodplain:** These floodplains represent an area of inundation having a one-percent chance of being equaled or exceeded in any given year.

**500-year floodplain:** These floodplains represent an area of inundation having a 0.2 percent chance of being equaled or exceeded in any given year.

**Aerosol:** A system of particles dispersed in a gas.

**Aesthetics:** The subjective perception of beauty in a landscape.

**Air emissions:** Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

**Alluvial:** Characterizing deposits of soil or gravel that are caused by flowing water.

**Alternatives or alternative plans:** Combinations of management measures that collectively meet study goals and objectives within the defined study constraints.

**Ambient air:** The air surrounding or contacting an organism, through which chemicals or pollutants can be carried and can reach the organism.

**Ambient noise:** The all-encompassing noise associated with a given environment at a specified time, being usually a composite of sounds from many sources at many directions, both near and far, that provide a relatively stable noise exposure with no particular dominant sound.

**Ammonium carbonate:** A compound of carbonate and ammonium, used in the manufacture of smelling salts and baking powder and ammonium compounds, which does not participate in atmospheric photochemical reactions.

**Amphipod:** A type of crustacean.

**Amplitude:** The maximum absolute value of a periodically varying quantity.

**Anadromous:** Species that ascend rivers from the sea for purposes of breeding.

**Anthropogenic:** Relating to, or resulting from, the influence of humans on nature (e.g., anthropogenic pollution).

**Aquifer:** An underground bed or stratum of earth, gravel, or porous stone that contains water.

**Arribada:** A mass nesting of sea turtles.

**Arsenic:** A poisonous chemical element that is used especially to kill insects and weeds.

**Asbestos:** A soft gray mineral that does not burn that was used especially as a building material in the past, and that can cause serious diseases of the lungs when people breathe its dust.

**Asbestos-containing material (ACM):** Building materials containing asbestos.

**Assay:** Examination and determination as to characteristics (as weight, measure, or quality).

**Assemblage/Species Assemblage:** A group.

**At-risk species:** Biologists commonly refer to species as “at-risk” if they face possible extinction from a geographic area. For the purposes of conservation strategy, the USFWS defines “at-risk species” as those species that have either been proposed for listing, are candidates for listing, or have been petitioned for listing.

**Atmospheric photochemical reaction:** A chemical reaction initiated by the absorption of energy in the form of light which takes places in the Earth’s atmosphere.

**Attainment area:** A geographic area that meets the National Ambient Air Quality Standard (NAAQS) is called an attainment area. An area with too much of a pollutant to meet the NAAQS for that pollutant is called a nonattainment area. NAAQSs are concentration levels for each of six criteria air pollutants, above which adverse effects on human health may occur. The six criteria pollutants are used as indicators of air quality.

**Baseline:** Information that is used as a starting point by which to compare other information.

**Benefits:** Valuation of positive performance measures.

**Benthic:** Living on or in sea, lake, or stream bottoms.

**Benzene:** A colorless volatile flammable toxic liquid aromatic hydrocarbon  $C_6H_6$  used in organic synthesis, as a solvent, and as a motor fuel; called also benzol.

**Beryllium:** A steel-gray light strong brittle toxic metallic element used chiefly as a hardening agent in alloys.

**Best management practice (BMP):** A practice or combination of practices determined to be the most practicable means of preventing or reducing, to a level compatible with environmental goals, the amount of pollution generated by nonpoint sources. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

**Bioassay:** Determination of the relative strength of a substance (such as a drug) by comparing its effect on a test organism with that of a standard preparation.

**Bioeffect:** A biological effect.

**Biomass:** The total mass of living matter (plant and animal) within a given unit of environmental area.

**Bivalve:** A typically marine animal that has a shell with two movable parts connected by a hinge, such as clams, oysters, or scallops.

**Bog:** A poorly drained usually acid area rich in accumulated plant material, frequently surrounding a body of open water, and having a characteristic plant community.

**Brackish marsh (BRM):** Intertidal plant community typically found in the area of the estuary where salinity ranges between 4 and 15 ppt.

**Brackish water:** A mixture of fresh and salt water.

**Calving:** Giving birth.

**Candidate species:** A plant or animal species for which USFWS or NOAA Fisheries has on file sufficient information on biological vulnerability and threats to support a proposal to list as threatened or endangered.

**Carbon dioxide (CO<sub>2</sub>):** A colorless, odorless, nonpoisonous gas that is a normal part of the ambient air. CO<sub>2</sub> is a product of fossil fuel combustion, and some researchers have theorized that excess CO<sub>2</sub> raises atmospheric temperatures.

**Carbon monoxide (CO):** A colorless, practically odorless, and tasteless gas or liquid. It results from incomplete oxidation of carbon in combustion. It burns with a violet flame, is slightly soluble in water, and is soluble in alcohol and benzene.

**Carbonic acid:** A chemical compound with the chemical formula H<sub>2</sub>CO<sub>3</sub>. It is also a name sometimes given to solutions of carbon dioxide in water, because such solutions contain small amounts of H<sub>2</sub>CO<sub>3</sub>.

**Carcinogen:** A substance or agent producing or inciting cancer.

**Cetaceans:** Any of an order (Cetacea) of aquatic mostly marine mammals that includes the whales, dolphins, porpoises, and related forms and that have a torpedo-shaped nearly hairless body, paddle-shaped forelimbs but no hind limbs, one or two nasal openings at the top of the head, and a horizontally flattened tail used for locomotion.

**Chassis:** Special trailer or undercarriage on which containers are moved over the road.

**Clean Water Act, Section 404(b)(1):** There are several sections of this Act that pertain to regulating discharges into wetlands. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of this Act and specifically under Section 404 (Discharges of Dredge or Fill Material) of the Act.

**Coastal zone:** Coastal waters and adjacent lands that exert a measurable influence on the uses of the sea and its ecology.

**Compensatory mitigation:** The restoration (reestablishment or rehabilitation), establishment (creation), enhancement, and/or, in certain circumstances, preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved.

**Component:** A site or portion of a site that is spatially and chronological discrete.

**Concurrence:** Agreement; also, a situation in which two or more things happen at the same time.

**Confluence:** The intersection of two or more streams, or where one flows into another.

**Connectivity:** Property of ecosystems that allows for exchange of resources and organisms throughout the broader ecosystem.

**Container:** A box for transporting cargo, constructed with varying dimensions to withstand transportation stresses.

**Contaminant:** A chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment.

**Control structure:** A gate, lock, or weir that controls the flow of water.

**Conveyance:** The ability of a channel or other drainage element to move stormwater.

**Corridor habitat:** Habitat consisting of a band of vegetation, usually older forest, which serves to connect distinct patches on the landscape and permit the movement of plant and animal species between what would otherwise be isolated patches.

**Critical habitat:** Specific geographic areas, whether occupied by a listed species or not, that are essential for its conservation and that have been formally designated by rule published in the *Federal Register*.

**Crustacean:** A group of aquatic animals characterized by jointed legs and a hard shell that is shed periodically, e.g., shrimp, crabs, crayfish, isopods, and amphipods.

**Cumulative impacts:** The combined effect of all direct and indirect impacts to a resource over time.

**Damage:** This term from the Congressional language is interpreted to mean damage to real property.

**Decapods:** Any of an order (Decapoda) of crustaceans (such as shrimps, lobsters, and crabs) with five pairs of appendages one or more of which are modified into pincers, with stalked eyes, and with the head and body fused and covered by an outer shell. Also, any of the cephalopod mollusks with 10 arms including cuttlefishes, squids, and related forms.

**Decibel (dB):** A unit for expressing the relative intensity of sounds on a scale from zero for the least perceptible sound to about 130 for the average pain level.

**Deciduous forest:** Forest composed mostly of trees that lose their leaves in the winter.

**Decomposition:** Breakdown or decay of organic materials.

**Delineate/Delineation:** To indicate, show, or describe the location of something; a stream or wetland delineation clearly identifies the boundaries and extent of surface water features.

**Demographic:** Of or relating to the statistical study of human populations, especially with reference to size and density, distribution, and vital statistics.

**Deposition:** The natural accumulation of soil, gravel, or cultural remains laid down by natural or artificial agencies.

**Detention pond:** A low lying area that is designed to temporarily hold a set amount of water while slowly draining to another location. Detention ponds are designed to slow the flow of water for flood control when large amounts of rain could cause flash flooding.

**Detritus:** The remains of plant material that has been destroyed or broken up.

**Dewatering:** The process of compacting dredged sediments through losing water after being deposited.

**Diadromous:** Migratory between salt and fresh waters.

**Dioxins:** Poisonous chemicals that are sometimes used in farming and industry such as pesticide manufacture, paper making, and waste incineration.

**Direct impacts:** Those effects that result from the initial construction of a measure (e.g., marsh destroyed during the dredging of a canal). Contrast with "Indirect Effects."

**Discharge:** The volume of fluid passing a point per unit of time, commonly expressed in cubic feet per second, millions of gallons per day, or gallons per minute.

**Dissolved oxygen:** Oxygen dissolved in water, available for respiration by aquatic organisms. One of the most important indicators of the condition of a water body.



**Dissolved solids:** The total amount of dissolved material, organic and inorganic, contained in water or wastes. Excessive dissolved solids make water unpalatable for drinking and unsuitable for industrial uses.

**Diurnal:** Relating to or occurring in a 24-hour period; daily.

**Diversión:** A turning aside or alteration of the natural course or flow of water. In coastal restoration, this usually consists of such actions as channeling water through a canal, pipe, or conduit to introduce water and water-borne resources into a receiving area.

**Downwellings:** The downward movements of colder, denser surface water, especially in the sea. Downwelling occurs when surface waters converge (come together), pushing the surface water downwards.

**Dredged material/Dredge Spoil:** Material excavated from waters of the United States or ocean waters. The term refers to material that has been dredged from a water body, while sediment refers to material in a water body prior to the dredging process.

**Dynamic:** Characterized by continuous change and activity.

**Ecological:** Refers to the relationship between living things and their environment.

**Economic:** Of or relating to the production, development, and management of material wealth, as of a country, household, or business enterprise.

**Ecoregion:** A major ecosystem defined by distinctive geography and receiving uniform solar radiation and moisture. In the United States, the US EPA defines ecoregions using a classification system with four levels. Level I divides North America into 15 broad ecoregions; of these, 12 lay partly or wholly within the United States. Fifty Level II regions were created to allow for a narrower delineation of Level I areas. Three level I areas were not subdivided for level 2. Level III subdivides the continent into 182 smaller ecoregions; of these, 104 lay partly or wholly with the United States. Level IV is a further subdivision of Level III ecoregions. The Proposed Project lies within the Southern Coastal Plain Level III ecoregion, and the Sea Islands/Coastal Marsh Level IV ecoregion.

**Ecosystem:** An organic community of plants and animals viewed within its physical environment (habitat); the ecosystem results from the interaction between soil, climate, vegetation, and animal life.

**Ecotone:** A transition area between two adjacent but different plant communities.

**Educational attainment:** A person's highest level of formal education (high school, college, etc.).

**Effluent:** A discharge of pollutants into the environment, partially or completely treated or in its natural state. Generally used in regard to discharges into waters.

**Elver.** A young eel, especially when undergoing mass migration upriver from the sea.

**Embankment:** A linear mound of earth or stone existing or built to hold back water or to support a roadway.

**Encroachment:** Entering gradually into an area not previously occupied, such as a plant species distribution changing in response to environmental factors such as salinity.

**Endangered species:** Animals and plants that are threatened with extinction.

**Enhancement:** The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

**Environmental Consequences.** Environmental effects of project alternatives, including the proposed action, any adverse environmental effects which cannot be avoided, the relationship between short-term uses of the human environment, and any irreversible or irretrievable commitments of resources which would be involved if the proposal should be implemented (40 CFR 1502.16).

**Environmental Impact Statement (EIS):** A document that describes the positive and negative environmental effects of a proposed action and the possible alternatives to that action. The EIS is used by the Federal government and addresses social issues as well as environmental ones.

**Environmental Justice:** The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

**Ephemeral:** Lasting a very short time.

**Eocene:** An Epoch (a major division of the geologic timescale) lasting from 56 to 33.9 million years ago. The oldest known fossils of most of the modern orders of mammals appear in a brief period during the early Eocene.

**Epifauna:** Benthic animals that crawl about on the sea bottom, or sit firmly attached to it.

**Erosion:** The gradual destruction of something by natural forces (such as water, wind, or ice): the process by which something is eroded or worn away.

**Essential Fish Habitat (EFH):** Those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity.

**Estuary / Estuarine:** A semi-enclosed body of water with freshwater input and a connection to the sea where fresh water and salt water mix; pertaining to an estuary.

**Evaporation:** The process by which any substance is converted from a liquid state into, and carried off in, vapor, e.g., the evaporation of water.

**Feasible and prudent alternative:** An alternative is feasible if it can be constructed as a matter of sound engineering. Typically, alternatives that are studied in a draft environmental impact statement or environmental assessment are feasible; otherwise they would not have been carried forward for detailed study. An alternative is determined to be prudent based on how it addresses safety or operational problems; how well the project purpose and need are met; the severity of social, economic, or environmental impacts; and the severity of impacts to environmental resources protected under other Federal statutes. A feasible and prudent alternative would meet the requirements for both feasible alternatives and prudent alternatives.

**Fine particulate matter:** A mixture of solid particles and liquid droplets found in the air, with diameters that are 2.5 micrometers and smaller. These particles cannot be seen with the naked eye. Examples of fine particulate matter include combustion particles, organic compounds, and metals.

**Flood Insurance Rate Map (FIRM):** The official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

**Floodplain:** The flat, low-lying portion of a stream valley subject to periodic inundation. Residences and businesses within the floodplain are considered to be at risk of damage by flooding.

**Fluvial deposits:** A sedimentary deposit from a river.

**Fugitive dust emissions:** Emissions of any solid particulate matter that becomes airborne without first passing through a stack or duct directly or indirectly as a result of the activities of man (i.e., anthropogenic), including the raising and/or keeping of animals.

**Gastropod:** Any of a large class (Gastropoda) of mollusks (as snails and slugs) usually with a univalve shell or none and a distinct head bearing sensory organs.

**Goals:** Statements on what to accomplish and/or what is needed to address a problem without specific detail.

**Gradient:** A slope; a series of progressively increasing or decreasing differences in a system or organism.

**Groundwater:** The supply of freshwater under the Earth's surface in an aquifer or soil that forms the natural reservoir for man's use.

**Habitat:** The specific area or environment in which a particular type of plant or animal lives. An organism's habitat provides all of the basic requirements for the maintenance of life. Typical coastal habitats include beaches, marshes, rocky shores, bottom sediments, mudflats, and the water itself.

**Habitat assessment:** The process by which the suitability of a site to provide habitat for a community or species is measured. This approach measures habitat suitability using an assessment model to determine HSI.

**Habitat loss:** The disappearance of places where target groups of organisms live. In coastal restoration, usually refers to the conversion of marsh or swamp to open water.

**Hazardous air pollutants (HAPs):** Chemicals that cause serious health and environmental effects. Health effects include cancer, birth defects, nervous system problems, and death due to massive accidental releases such as occurred at the pesticide plant in Bhopal, India. Hazardous air pollutants are released by sources such as chemical plants, dry cleaners, printing plants, and motor vehicles (cars, trucks, buses, etc.).

**Hazardous, Toxic, and Radioactive Wastes (HTRW):** The features of projects must be examined to ensure that their implementation will not result in excessive exposure to HTRW pollutants possibly located in the study area.

**Herbaceous:** A plant with no persistent woody stem above ground.

**Holocene:** Geological period from about 10,000 B.C. to the present characterized by the recession of glaciers.

**Hydric soils:** Soils that are characterized by, related to, or require an abundance of moisture.

**Hydrology:** The pattern of water movement on the Earth's surface, in the soil and underlying rocks, and in the atmosphere.

**Hydrophytic vegetation:** Any vegetation that can grow only in water or very wet soil.

**Ichthyoids:** A fish or fishlike vertebrate.

**Impervious:** Not allowing water to enter or pass through.

**Indirect impacts:** Those effects that are not a direct result of project construction, but occur as secondary impacts due to changes in the environment brought about by the construction. Contrast with "direct impacts."

**Infrastructure:** The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons.

**Inorganic:** Not derived from living organisms; mineral; matter other than plant or animal.

**Interaquifer contamination:** Contamination that moves from one aquifer to another.

**Intertidal:** Alternately flooded and exposed by tides.

**Intertidal zone:** The marine zone between the highest high tide point on a shoreline and the lowest tide point. The intertidal zone is sometimes subdivided into four separate habitats by height above tidal datum, typically numbered 1 to 4, land to sea.

**Invasive Species:** A species that is not native to an ecosystem and which causes, or is likely to cause, economic or environmental harm or harm to human health.

**Invertebrates:** Animals without backbones, including shrimp, crabs, oysters, and worms.

**Iron:** A heavy malleable ductile magnetic silver-white metallic element that readily rusts in moist air, occurs native in meteorites and combined in most igneous rocks, is the most used of metals, and is vital to biological processes.

**Jurisdictional Determination (JD):** An official Corps determination that jurisdictional [subject to the law] “waters of the United States,” or “navigable waters of the United States,” or both, are either present or absent on a particular site. An approved JD precisely identifies the limits of those waters on a project site determined to be jurisdictional under the Clean Water Act.

**Lagoon:** A shallow body of seawater generally isolated from the ocean by a barrier island. Also the body of water enclosed within an atoll, or the water within a reverse estuary.

**Larva (pl. larvae):** An embryo that differs markedly in appearance from its parents and becomes self-sustaining before assuming the physical characteristics of its parents. The stage in some animals’ life cycles between egg and adult (most invertebrates).

**Late Cretaceous:** A geologic time period called an Epoch, lasting from approximately 100 million years before present to 66 million years before present. The Cretaceous period is named after the white limestone known as chalk which occurs widely in northern France and is seen in the white cliffs of south-eastern England, and which dates from this time.

**Lead:** A heavy metal that may be hazardous to human health if breathed or ingested.

**Levee:** A linear mound of earth or stone built to prevent a river from overflowing; a long, broad, low ridge built by a stream on its flood plain along one or both banks of its channel in time of flood.

**Loam:** Soil composed of a mixture of sand, clay, silt, and organic matter.

**Logarithmic:** A scale where a base number (such as 10) has been multiplied by itself to produce an increasing scale.

**Macroinvertebrates:** An invertebrate (lacking a backbone) large enough to be seen without magnification.

**Macrophyte:** A member of the visible plant life especially within a body of water.

**Management measures:** A feature (a structural element that requires construction or assembly on-site) or an activity (a nonstructural action) that can be combined with other management measures to form alternative plans.

**Maritime Forest:** A forest located next to or bordering the sea.

**Measure:** A programmatic restoration feature that can be assembled with other measures to produce alternative plans. See also “Project.”



**Mercury:** A heavy metal, highly toxic if breathed or ingested. Mercury is residual in the environment, showing biological accumulation in all aquatic organisms, especially fish and shellfish. Chronic exposure to airborne mercury can have serious effects on the central nervous system.

**Metallic carbides / metallic carbonates:** Any of a class of chemical compounds in which carbon is combined with a metallic or semimetallic element.

**Methodology:** A set of practices, procedures, and rules.

**Mitigation:** Minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; compensating for the impact by replacing or providing substitute resources or environments.

**Mudflats:** Flat, unvegetated wetlands subject to periodic flooding and minor wave action.

**National Environmental Policy Act (NEPA):** Ensures that Federal agencies consider the environmental impacts of their actions and decisions. NEPA requires all Federal agencies to consider the values of environmental preservation for all significant actions and prescribes procedural measures to ensure that those values are fully respected.

**National Register of Historic Places (NRHP),** a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture maintained by the Secretary of the Interior.

**Natural features:** This term from the Congressional language is interpreted to mean those features that primarily serve an ecosystem restoration purpose rather than features that primarily serve another purpose, such as levees or floodwalls.

**Near-dock:** Near-dock port facilities are located landward of the marine terminal. Cargo containers are transported by over-the-road (OTR) trucks and/or Utility Tractor Rig (UTR) trucks to the near-dock facility from the marine terminal or from the near-dock facility to the marine terminal. Near-dock facilities may serve multiple marine terminals.

**Nephelometric Turbidity Units (NTUs):** The unit used to describe turbidity. Nephelometric refers to the way the instrument, a nephelometer, measures how much light is scattered by suspended particles in the water.

**Neritic zone:** In marine biology, the neritic zone refers to that zone of the ocean where sunlight reaches the ocean floor. The neritic zone is sometimes also called coastal waters, the coastal ocean or the sublittoral zone.

**Net loss:** The amount of cumulative land gain less land loss, when gain is less than loss.

**Nitrogen dioxide:** A reddish-brown poisonous gas used in the manufacture of nitric acid. It is also an air pollutant, a constituent of untreated automobile exhaust.

**Nitrogen oxide:** Any of several oxides of nitrogen, most of which are produced in combustion and are considered to be atmospheric pollutants.

**No Action Alternative:** Also referred to as the future without project condition (FWOP), the No Action Alternative describes the project site's future if there is no Federal action taken to solve the problem(s) at hand. Every alternative is compared to the same without-project condition.

**Nonattainment area:** A geographic area in which the level of a criteria air pollutant is higher than the level allowed by the Federal standards. A single geographic area may have acceptable levels of one criterion air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and nonattainment at the same time. It has been estimated that 60 percent of Americans live in nonattainment areas.

**Non-point source pollutant:** A source of pollution that is not highly concentrated enough to warrant its being classified as point source pollution.

**Nonthreshold pollutant:** A substance or condition harmful to a particular organism at any level or concentration.

**Noxious species:** A plant or animal that has been designated as harmful to health, agriculture, recreation, natural habitats or ecosystems, wildlife, humans, or property. Noxious species can be native or non-native to an area.

**Nursery:** A place for larval or juvenile animals to live, eat, and grow.

**Objectives:** Statements that are more specific than goals, describing how to achieve the desired targets.

**On-dock:** On-dock port facilities are located immediately adjacent to a marine terminal. Cargo containers may be transferred directly between the marine terminal and the on-dock facility.

**Ordinary high water mark:** A line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

**Organic:** Composed of or derived from living things.

**Organism:** Any living human, plant, or animal.

**Ozone:** A triatomic form of oxygen that is a bluish irradiating gas of pungent odor, is formed naturally in the upper atmosphere by a photochemical reaction with solar ultraviolet radiation, or is generated commercially by a silent electric discharge in ordinary oxygen or air; it is a major agent in the formation of smogs, and is used especially in disinfection and deodorization and in oxidation and bleaching.

**Palustrine:** Of or related to a swamp or marsh.

**Panamax:** Refers to the maximum dimensions of a vessel to transit the Panama Canal (maximum beam of 32.3 meters or 106 feet).

**Particulate matter:** Very fine solid or liquid particles in the air or in an emission, including dust, fog, fumes, mist, smoke, and spray, etc.

**PCBs:** Polychlorinated biphenyls, a group of organic compounds used in the manufacture of plastics. In the environment, PCBs exhibit many of the same characteristics as DDT and may, therefore, be confused with that pesticide. PCBs are highly toxic to aquatic life, they persist in the environment for long periods of time and are biologically accumulative.

**Peak flow:** The highest flow volume within a stream following a precipitation event, or over a given period of time.

**Peak hour traffic volume:** Highest hourly traffic volume during a typical week.

**Pelagic habitat:** Habitat within ocean waters. The pelagic zone of the ocean begins at the low tide mark and includes the entire oceanic water column. The pelagic ecosystem is largely dependent on the phytoplankton inhabiting the upper, sunlit regions, where most ocean organisms live.

**Performance standards:** Observable or measurable physical (including hydrological), chemical, and/or biological attributes that are used to determine whether a compensatory mitigation project meets its objectives.

**Period of analysis:** The time horizon for which project benefits, deferred construction costs, and operation, maintenance, repair, rehabilitation, and replacement costs are analyzed. **For this study, the period of analysis is from 2018 (facility opening) through 2038 (20-year planning horizon).**

**Permeability:** The quality or state of being permeable (penetrable).

**Perennial:** Lasting for a long period of time; year-round.

**Pervious:** Giving passage or entrance; permeable.

**Petrochemical:** Any compound derived from petroleum or natural gas.

**Pinnipeds:** Carnivorous aquatic mammal of the order Pinnipedia, such as seals or walruses.

**Phosphate:** A salt or ester of phosphoric acid; an organic compound of phosphoric acid in which the acid group is bound to nitrogen or a carboxyl group in a way that permits useful energy to be released.

**Photochemical oxidants:** The products of reactions between nitrogen oxide and a wide variety of volatile organic compounds (VOCs). The most well-known 'oxidants' are ozone (O<sub>3</sub>), peroxyacetylene nitrate (PAN) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). The main impact on the natural environment is mostly due to elevated O<sub>3</sub>.

**Photochemical smog:** The chemical reaction of sunlight, nitrogen oxides and volatile organic compounds in the atmosphere, which leaves airborne particles and ground-level ozone.

**Phytoplankton:** Plantlike, usually single-celled members (generally microscopic) of the plankton community.

**Plankton:** Drifting or weakly swimming organisms suspended in water. Their horizontal position is to a large extent dependent on the mass flow of water rather than on their own swimming efforts.

**Planktonic:** Floating in the water column.

**Planning horizon:** The amount of time an organization will look into the future when preparing a strategic plan. The ICTF is projected to open in 2018; a 20-year planning horizon is considered in this EIS in order to evaluate potential impacts of the facility.

**Planktonic larvae:** The most common early life stage of marine invertebrates, many of whom live on the bottom as adults. Some examples are crabs, clams, sea stars, barnacles, shrimp, worms, sponges, corals, and sea urchins. Also known as "meroplankton".

**Pleistocene:** Geological period from about 3,000,000 B.C. to 10,000 B.C. characterized by the appearance and recession of glaciers.

**Point source pollution:** A source of pollution that is so highly concentrated it can be considered to come from a single point.

**Pollutant load:** The total amount of a pollutant in a waterbody, regardless of concentration.

**Polybrominated diphenyl ethers (PBDEs):** Compounds that are used as flame retardants in a wide array of products, including building materials, electronics, furnishings, motor vehicles, airplanes, plastics, polyurethane foams, and textiles.

**Polychaetes:** Segmented worms, mostly marine, bearing paddlelike appendages on the body segments, which, in turn, carry numerous bristles.

**Polycyclic aromatic hydrocarbons (PAHs):** A group of chemicals that occur naturally in coal, crude oil and gasoline. PAHs also are present in products made from fossil fuels, such as coal-tar pitch, creosote and asphalt. When coal is converted to natural gas, PAHs can be released.

**Post-larval:** Stage in an animal's lifecycle after metamorphosis from the larval stage, but when it is not yet fully grown.

**Post-Panamax:** Refers to vessels with maximum beam dimensions of 32.3 meters (106 feet) and greater (also see Panamax).

**Potable water:** Water that is fit to drink.

**ppt:** parts per thousand. The salinity of ocean water is approximately 35 ppt.

**Prehistoric:** Human culture that existed prior to written records.

**Preservation:** The removal of a threat to and/or preventing the decline of aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

**Principles:** Framing statements that can be used to evaluate alternatives while considering issues that affect them. Used along with targets and assessments of ecosystem needs to provide guidance in formulation of alternative plans.

**Project:** A constructible increment of an alternative plan.

**Protected species:** A term that includes all Federal and state-listed threatened, endangered, at-risk, and candidate vegetation and wildlife species.

**Pursuant:** In accordance with; according to.

**Proposed species:** Any taxa proposed for listing as threatened or endangered.

**Quadrangle map:** A map of the rectangular area represented by one of the U.S. Geological Survey topographic and geological maps. The two common sizes of tracts are about 13 miles wide by 17 miles north to south and 6½ miles wide by 8½ miles north to south.

**Quadrants:** One of the four parts into which a plane is divided by the coordinate axes. The upper right-hand part is the first quadrant; the upper left-hand part the second; the lower left-hand part the third; and the lower right-hand part the fourth quadrant.

**Qualitative:** A descriptive measure of a thing; an assessment that does not rely on specific numeric measurement.

**Quantitative:** Able to assign a specific number; susceptible to measurement.

**Radionuclide:** A radioactive type of atom.



**Radon:** A gaseous, inert, radioactive element, formed by the radioactive decay of radium. Radon has at least 17 known isotopes. Traces of it are found in the air in various amounts.

**Rebuild:** To some extent, to build back a structure/landform that had once existed.

**Recharge area:** An area in which water reaches the zone of saturation by surface infiltration.

**Record of Decision (ROD):** A comprehensive summary required by the National Environmental Policy Act that discusses the factors leading to U.S. Army Corps of Engineers decisions on regulatory and Civil Works matters; it is signed by the USACE District Engineer after completion of appropriate environmental analysis and public involvement.

**Re-establishment:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

**Rehabilitate:** To focus on historical or pre-existing ecosystems as models or references while emphasizing the reparation of ecosystem processes, productivity, and service.

**Rehabilitation:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

**Related Activity:** Additional construction of new track that is required in order to connect the ICTF to existing Class I carrier rail networks is collectively referred to as Related Activity or Related Activities. This construction is not a part of the Proposed Project. It would be constructed by the Class I carriers and may require separate environmental permitting.

**Relative sea level rise:** Sea level rise measured by a tide gauge with respect to the land upon which it is situated. Relative sea level rise occurs where there is a local change in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence. See also eustatic sea level rise.

**Relatively permanent waters:** Waters where flow is year-round, or at least seasonally continuous.

**Resident species:** An animal that does not migrate.

**Respirable particulate matter (PM<sub>10</sub>):** Inhalable coarse particles with a diameter between 2.5 and 10 micrometers.

**Restoration:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

**Restore:** Return a wetland to a close approximation of its condition or function prior to disturbance by modifying conditions responsible for the loss or change; re-establish the function and structure of that ecosystem.

**Riparian:** The area of land along and adjacent to a waterway (river, bayou, creek, stream, etc.). Trees, plants, and grasses along these waterways are called riparian vegetation. A riparian zone from an ecological perspective may occur in many forms, including grassland, woodland, wetland, or even nonvegetative. Riparian zones may be natural or engineered for soil stabilization or restoration. In some regions, the terms riparian woodland, riparian forest, riparian buffer, or riparian corridor are used to characterize a riparian zone.

**Risk:** A measure of the probability and severity of undesirable consequences (including, but not limited to, loss of life, threat to public safety, and/or environmental and economic damages). In the case of ecosystem values, the important risk factors are those that affect the possibility of service flow disruptions and the reversibility of service flow disruptions.

**Riverine:** Relating to or resembling a river.

**Runoff:** The portion of rainfall, melted snow, or irrigation water that flows across ground surface and eventually is returned to streams. Runoff can pick up pollutants from the air or the land and carry them to receiving waters.

**Saline marsh (SAW):** Intertidal herbaceous plant community typically found in that area of the estuary with salinity ranging from 12 to 32 ppt.

**Salinity:** The concentration of dissolved salts in a body of water, commonly expressed as parts per thousand.

**Salt marshes:** See “Saline Marsh.”

**Sargassum seaweed:** A brown, generally free-floating type of seaweed that usually inhabits shallow water and coral reefs.

**Savanna:** A grassy plain in tropical and subtropical regions, with few trees.

**Scoping:** Soliciting and receiving public input to determine issues, resources, impacts, and alternatives to be addressed in the draft EIS.

**Scoping period:** The scoping period for an EIS begins after publication in the *Federal Register* of a Notice of Intent (NOI) to prepare an EIS. The public scoping period is that portion of the process where the public is invited to participate.

**Sea level:** Long-term average position of the sea surface.

**Sea level change (SLC):** A long-term measure of relative sea level rise or lowering.

**Sediment:** The layer of soil, sand, and minerals at the bottom of surface water that absorbs contaminants.

**Sedimentary:** Rock formed of mechanical, chemical, or organic sediment.

**Sedimentation:** The action or process of forming or depositing sediment; settling.

**Sedimentation/retention pond or basin:** A pond that is larger than a catchment basin and preferably with lower velocity waterflows to enable suspended sediment to settle before the flow is discharged into a creek.

**Semi-volatile organic compound (SVOC):** A semi-volatile organic compound has a boiling point higher than water and may vaporize when exposed to temperatures above room temperature. Semi-volatile organic compounds include phenols and polynuclear aromatic hydrocarbons (PAHs).

**Sessile:** Fixed in one place; an immobile organism that is attached by its base, such as a plant or barnacle.

**Sheet flow:** Flow of water, sediment, and nutrients across a flooded wetland surface, as opposed to through channels.

**Shoaling:** The shallowing of an open-water area through deposition of sediments.

**Silt fence:** A perimeter sediment control device. Generally, silt fence is constructed of porous woven geotextile fabric attached to wooden posts.

**Sirenians:** Any large aquatic plant-eating mammal of the order Sirenia, such as a manatee or dugong.

**Slough:** A creek in a marsh or tidal flat.

**Socioeconomic:** Involving both social and economic factors.

**Soil series:** A group of soils with similar profiles developed from similar parent materials under comparable climatic and vegetational conditions.

**Soil surcharge:** The material used to consolidate poorly drained soils; consolidation of poorly drained soils.

**Solvent:** A liquid in which other substances are dissolved in order to form a solution.

**Source emission rate:** Rate at which any pollutant is released from any place or object that produces it.

**Spawning:** The release or deposition of eggs by a fish, frog, mollusk, or crustacean.

**Stabilize:** To fix the level or fluctuation of; to make stable.

**Staging area:** An assembly place, or a place where things are stored adjacent to a construction site.

**State Historic Preservation Office (SHPO):** A state governmental function created by the National Historic Preservation Act (NHPA). The purposes of a SHPO include surveying and recognizing historic properties; reviewing nominations for properties to be included in the National Register of Historic Places; reviewing undertakings for the impact on the properties; and supporting Federal organizations, state and local governments, and the private sector.

**Stolon:** A creeping horizontal plant stem or runner that takes root at points along its length to form new plants.

**Storm sewer:** A sewer built to carry away excess water in times of heavy rain.

**Storm surge:** An abnormal and sudden rise of the sea along a shore as a result of the winds of a storm.

**Stormwater:** Generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment, or other pollutants that could adversely affect water quality if the runoff is discharged untreated.

**Stormwater retention/detention pond:** A pond designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground, or to hold surface and stormwater runoff for a short period of time and then release it to the surface and stormwater conveyance system.

**Subsidence:** The gradual downward settling or sinking of the Earth's surface with little or no horizontal motion.

**Substrate:** A layer of material on which an organism can grow and multiply.

**Subtidal:** A near-shore area of relatively shallow water that receives sunlight but which lies below the low-tide mark.

**Sulfur dioxide (SO<sub>2</sub>):** A heavy, pungent, toxic gas that is easily condensed to a colorless liquid, is used especially in making sulfuric acid, in bleaching, as a preservative and as a refrigerant, and is a major air pollutant—especially in industrial areas.

**Superfund:** The common name used for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

**Surface water:** Water on the Earth's surface exposed to the atmosphere as rivers, lakes, streams, and oceans.

**Sustain:** To support and provide with nourishment to keep in existence; maintain.

**Swale:** A low or hollow place, especially a marshy depression between ridges.

**Taxon:** Ataxonomic categories, such as families or orders.

**Taxonomic category:** A classification used in the naming of organisms as a part of an ordered system that is intended to indicate natural relationships, especially evolutionary relationships.

**Temperate:** Mild; often used to describe the average temperature or climate of a region.

**Terrace:** A level, flat area in a landscape, resembling a step. Terrace features can result naturally from processes associated with moving water or geology.

**Terrestrial habitat:** The land area or environment where an organism lives; as distinct from water or air habitats.

**Tertiary:** A term for the geologic period from 66 million to 2.58 million years ago.

**Threatened species:** An animal or plant whose existence is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

**Throughput:** The amount of cargo that reasonably can be expected to be processed, given the physical facilities available, the operating conditions present, and the business conditions characteristic of the trade in which the terminal is engaged.

**Toluene:** A liquid aromatic hydrocarbon  $C_7H_8$  that resembles benzene but is less volatile, flammable, and toxic; is produced commercially from light oils from coke-oven gas and coal tar and from petroleum; and is used as a solvent, in organic synthesis, and as an anti-knock agent for gasoline.

**Total Maximum Daily Load (TMDL):** A calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

**Toxic pollutant:** Pollutants—or combinations of pollutants, including disease-causing agents—that, after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of the U.S. Environmental Protection Agency, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, or physical deformations in such organisms or their offspring.

**Toxicity:** The amount of toxin or poison found in a substance or produced by an organism; the potency of a toxic substance.

**Toxics Release Inventory (TRI):** A Federal inventory of approximately 650 harmful chemicals or classes of chemicals released to the environment or transferred off-site by specific industries in the U.S.

**Traditionally Navigable Waters (TNWs):** A legal term used by the Corps and the EPA in order to assert jurisdiction over any water body that is (a) subject to the ebb and flow of the tide, and/or (b) the water body is presently used, or has been used in the past, or may be susceptible for use (with or without reasonable improvements) to transport interstate or foreign commerce.



**Transient:** An organism that passes through or by a place with only a brief stay or sojourn.

**Transpiration:** The process by which water passes through living plants into the atmosphere.

**Tributary / Tributaries:** Streams that flow into larger streams or bodies of water.

**Turbidity:** An optical measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity may be harmful to aquatic life.

**Turbidity barrier:** A device or curtain used to trap sediment in water bodies.

**Twenty-foot equivalent unit (TEU):** The volume of one 20-foot container; the standard volume unit for describing a container terminal's cargo-handling capacity.

**Uncertainty:** Uncertainty is the result of imperfect knowledge concerning the present or future state of a system, event, situation, or (sub) population under consideration. There are two types of uncertainty: the uncertainty attributed to inherent variation that is understood as variability over time and/or space, and the uncertainty attributed to our lack of knowledge about the system (e.g., what value to use for an input to a model or what model to use). Uncertainty can lead to lack of confidence in predictions, inferences, or conclusions.

**Upland (UPL):** A general term for non-wetland elevated land above low areas along streams or between hills.

**Vinyl chloride:** A colorless toxic gas used in the production of polyvinyl chloride and other commercially important chemicals.

**Volatile organic compounds (VOC):** Secondary petrochemicals—including light alcohols, acetone, trichloroethylene, perchloroethylene, dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride—that are used as solvents, degreasers, paint thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to humans. Due to their low water solubility, environmental persistence, and widespread industrial use, they are commonly found in soil and groundwater.

**Water column:** The open-water environment, as distinct from the bed or shore, which may be inhabited by swimming marine or freshwater organisms.

**Waters of the U.S.:** 40 CFR 230.3(s). The term waters of the United States means:

1. All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;
2. All interstate waters, including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters:
  - (i) That are or could be used by interstate or foreign travelers for recreational or other purposes; or
  - (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
  - (iii) That are or could be used for industrial purposes by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in paragraphs (s)1 through 4 above;

6. The territorial sea;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s) 1 through 6 above; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m), which also meet the criteria of this definition) are not waters of the United States.

Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

**Watershed:** A geographical region of land or "drainage area" that drains to a common channel or outlet. Drainage of the land can occur directly into a bayou or creek, or through a series of systems that may include storm sewers, roadside ditches, and/or tributary channels.

**Weir:** A dam placed across a canal or river to raise, divert, regulate, or measure the flow of water.

**Wetlands:** Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated-soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR Part 230), especially areas preserved for wildlife, zooplankton (planktonic animals that supply food for fish).

**Wildlife value (WV):** The maximum ambient water concentration of a substance at which adverse effects are not likely to result in population-level impacts to mammalian and avian wildlife populations from lifetime exposure through drinking water and aquatic food supply.

**Xeric:** Characterized by, relating to, or requiring only a small amount of moisture.

**Zooplankton:** Animal members of the plankton community.

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